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ABSTRACT

This Sloan Foundation report for 1976 discusses foundation activities in the three facets of the General Program--(1) Education for the Public Service, (2) Economics and Management, and (3) Science and Technology--as well as in three Particular Programs--(1) Minority Engineering Education, (2) Technology in Education, and (3) Neuroscience. The Foundation commits approximately 60% of its resources to the General Program and 40% to the Particular Programs. Also included in the report are lists of trustees, officers, staff, the President's Statement, miscellaneous grants, policies and procedures, and a financial review. (STS)

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Report for 1976

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President's Statement

As one who as a university administrator sought foundation support over a period of many years, I can understand why petitioners for such support often react with wry amusement to the statement that a particular foundation's funds are "limited" and that the foundation therefore must establish boundaries, defined as "program," restricting the kinds of activities it supports. The statement is nonetheless true and for the very fact that it is true, it behooves foundations to make as clear as possible the nature of the constraints under which they operate. It is equally important that they indicate well in advance of actual grant making any new program interests they intend to pursue.

The well managed foundation must be aware of and even welcome the tension generated between consistency and change. Programs well conceived and timely in their day may become irrational with the passing of time. On the one hand, foundations must be scrupulous about performing what they have set themselves to perform; on the other hand, they should be constantly aware that the customary must not be permitted to harden into the sacrosanct.

With these general principles in mind the Sloan Foundation defines its program interests as science, technology and engineering, economics and management, and higher education related to those fields. An elaboration of this brief statement can be found in the grants made in 1976 and described in the body of this Report.

During the year the Trustees of the Foundation gave their approval to two modifications in its program, one under what the Foundation has come to call its "General Program" and the other under the rubric of "Particular Programs." The fields represented are, respectively, higher education for public service and the cognitive sciences.

An interest in education for public service has been reflected in indirect ways in the Foundation's program for several years although not made as

explicit as it now will be. This past history is of some relevance and may be of interest to individuals and institutions which share the Foundation's concern.

In 1970 a proposal was received from the Kennedy School of Government at Harvard University seeking support to help create a graduate program in Public Policy. The proposal was not entirely "in program" and not entirely "out of program." The field itself was a new one for higher education, its curriculum an amalgam of pragmatic political science, applied economics, and analytic methods derived in part from post-war developments in operations research and mathematical modeling by way of the computer.

The proposal clearly involved economics and certain specialized applications of science. Yet public policy analysis was well outside the Foundation's ordinary program guidelines. However, the proposal was recommended to the Trustees based on the conviction that it did intersect with several interests of the Foundation although it could not be placed in any single program area. It was clearly related to the Foundation's interests in broadening management education to include preparation for public and not-for-profit enterprises. Its application of more scientific method to policy decision making and its relevance to urban management also touched on other Foundation interests. The Trustees welcomed the proposal and approved it.

Later in that year a proposal was received from the Graduate School of Business at Stanford University, seeking funds with which to plan the development of a "new Master of Business Management program in urban management." This was, to be sure, well within program: management education at a business school. But coming as it did on the heels of the Kennedy grant, it was noted that the Stanford plans were to a large extent much like the Kennedy plans, and that the "urban management" program at one site had elements in common with the "public policy" plans at the other. This proposal was also funded.

In mid-1971, Carnegie-Mellon University approached the Foundation with a proposal that again was partly in and partly outside program. Carnegie-Mellon felt that the engineering education it was providing was not totally responsive to the growing importance of the interaction of engineering practice with explicitly sensed social concerns. The University asked the Foundation for financial assistance in bringing into being a curriculum dealing with the economic, political, and social implications of engineering practice. Not only was a grant made to Carnegie-Mellon, but the Foundation, in 1972, invited more than twenty other schools of engineering to make proposals for the same or similar purposes. By the end of 1974, grants totaling more than $8 million had been made to twenty-five schools of engineering.

In due course, Carnegie-Mellon came to the conclusion that there was need to develop a program at the doctoral level with the same emphasis and orientation, in part to provide the faculty for its own and for other doctoral

programs, and in part to establish the field itself as a respectable academic engineering sub-discipline.

As the Foundation reviewed the twenty-five grants that had followed upon the original Carnegie-Mellon proposal, it became clear that many of the institutions had in fact instituted programs that could be described as programs in "engineering and public policy." The Stanford program in urban management had meanwhile developed into a program in public management which included the federal and state levels as well as the local level. Other schools of business were following a similar route. The movement toward public policy programs was spreading rapidly through major universities.

All of these programs were designed in one way or another to provide professional preparation for public service. Some of the better schools of public administration were also incorporating aspects of public policy into their academic offerings. Schools of law, which in practice provided so large a portion of the entrants into public service, were beginning to examine their public policy curricula with a view to joint degree arrangements and the provision of some elements of such curricula within the law schools themselves.

Closely related though these various lines of development were, they were in fact proceeding almost in isolation one from the other. In an attempt to reduce that isolation, the Foundation convened in the summer of 1976 a week-long seminar to which were invited representatives of all of these major approaches, represented by schools of public policy, of management, of public administration, of engineering and of law. The seminar was most instructive to the Foundation. At the same time it engendered among the disparate groups a feeling of community that had been largely absent. It stimulated joint efforts among them.

The officers and staff of the Foundation were persuaded that "education for public service" represented a coherent educational undertaking and one to which the Foundation would be justified in offering substantial support. The Trustees approved such a recommendation and grants were made during the last half of 1976. With this Annual Report education for public service formally becomes an element in the Foundation program.

This whole development illustrates how important a degree of flexibility in Foundation program planning is, enabling the Foundation to be responsive to real needs and promising opportunities even when they do not fit neatly Foundation program guidelines. In no small measure the insights developed within the Foundation are brought to it by those whom the Foundation serves. Such receptivity and sensitivity are important hallmarks of the properly managed foundation.

The second significant modification in the Foundation's program is represented by a new Particular Program in the Cognitive Sciences. During 1976 the last two of the original three Particular Programs were terminated, on sched-

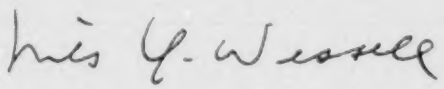
ule: the Particular Program in Neuroscience extending over a period of seven years involved the expenditure of more than $12 million; the Particular Program in Technology in Education expended $8 million over six years. The Particular Program in Minorities in Engineering, now in the fourth year, continues.

Much of 1976 was spent in planning the new Particular Program in Cognitive Sciences, to be initiated in 1977. It will attempt to encourage a greater degree of multidisciplinary work in such fields as experimental psychology, linguistics, computer science and even neuroscience. Those fields in concert appear to be on the verge of great forward movement, and the investment of $12 to $15 million by the Foundation over a five-year period seems well supported by this evidence of promising significant developments.

As is now a regular part of the Foundation's program planning, during 1977 still another Particular Program will be identified to be put in place during 1978. Over time the Foundation commits approximately 60% of its resources to its General Program and 40% to Particular Programs, three of which are usually in operation at any given time.

Trustees of the Foundation acceded with regret to the requests of Edwin D. Etherington and Clifton C. Garvin, Jr., not to stand for reelection to the Board at its annual meeting on May 25, 1976. Mr. Etherington has served as a Trustee since 1969 and Mr. Garvin since 1972. Both will be missed in the years ahead.

January 1977



General and Particular Programs

The Foundation's operating concept allocates approximately 60 per cent of its resources to its General Program and 40 per cent to Particular Programs. In the General Program the grant-making operation is much like that of other general-purpose foundations, pursuing the established Sloan interests in science and technology, economics and management, and such other activities as may arise out of those interests. Particular Programs, on the other hand, represent sharply focused efforts in specific problem areas over limited periods of time; typically they involve expenditures of $10 million to $15 million over five to seven years.

The Foundation is now at a point in the evolution of its Particular Programs where the first three such programs have run their course and have been phased out. In this category are the former Particular Programs concerned with Minorities in Medicine and Management, Neuroscience, and Technology in Education. At the same time a fourth program, in Minority Engineering Education, is operating at a maximum level and a fifth one, in Cognitive Sciences, has been approved by the Board of Trustees and will begin operation in 1977. During 1977 the officers and staff will be investigating possible subjects for a sixth Particular Program, which would return these programs to their normal complement of three.

Termination of a Particular Program does not signify an end to the Foundation's interest in that area; unusual opportunities can still be considered for support under the General Program. It is also expected that such a program will be sufficiently important to generate interest and support from sources other than the Foundation. For the Foundation the intention is that proposed commitments set aside for highly specific purposes will be redirected periodically into areas of fresh challenge.

General Program

Education for the Public Service

The manner in which the Foundation came to be involved with programs of higher education designed to prepare graduates for careers in the public service has been described in the President's Statement earlier in this Report. As is explained in that statement, such programs have evolved in schools of engineering, in graduate schools of business management, in schools of public administration or public affairs, and in the newer schools more explicitly concerned with public policy formation. There is also movement in the direction of public-service education in some schools of law, which traditionally have prepared many if not most of the nation's political leaders.

Wherever found, most such programs share certain characteristics: their graduates are expected to master statistical and analytic mathematical tools; they must be equipped to assess critically the data of economists, and to understand the intricacies of political science; and they must by some means become familiar with the technological issues that underlie most problems in public management and public policy.

From its base of interests in engineering and management, the Sloan Foundation has expanded its concerns to programs of public-service education in the newer schools grounded in the applied social sciences (but not, thus far, to programs in schools of law). Overall, the Foundation in 1976 granted some $2.5 million to various kinds of institutions for activities in education for the public service, at levels ranging from undergraduate to doctoral training. As will be seen in the descriptions which follow, the programs go by many different names and proceed from different academic bases or combinations of bases; their discussion under one or another disciplinary rubric is in some instances purely a matter of convenience.

Engineering-Based Programs

• A 1971 grant to Carnegie-Mellon University was an early step by the Foundation into the field of education for the public service, although that was only dimly apparent at the time. Following the first grant to Carnegie-Mellon, for a new undergraduate Program in Engineering and Public Affairs, there was a series of major grants to other institutions, all for the general purpose of introducing engineering students to the complex social, economic, and political issues which must be confronted in attacking today's engineering problems. Twenty-five grants for this purpose, amounting to $8 million, were awarded over a five-year period.

Engineering and Public Affairs, renamed Engineering and Public Policy, is now fully established at Carnegie-Mellon; program enrollment is close to 100 undergraduates, and its earlier students are pursuing careers in engineering, business, and government. In 1976 Carnegie-Mellon proposed to take a further step: the creation of a graduate program in Engineering and Public Policy leading to the Ph.D. in that field with, optionally, a concurrent M.S. in one of the traditional engineering departments.

The new graduate program, apart from supplying new faculty to teach the analytical and problem-solving techniques demanded by our increasingly technological society, is expected to contribute to the growth of technology and public policy as a recognized discipline in its own right. Research to develop the generalizable insights and methodological tools of a new profession can be conducted only at the graduate and postdoctoral levels; a demonstrated record of accomplishment at those levels is a prerequisite to academic recognition of a new discipline. To assist Carnegie-Mellon in moving toward this goal, a three-year grant of $350,000 was approved in 1976.

• At Massachusetts Institute of Technology a new program offering the master's degree in Technology and Policy began in the fall of 1976 with renewed Sloan support. The program concentrates on problems that relate primarily to the operation of complex industrial and public systems. It offers an opportunity for interaction between faculty and students from separate discipline-oriented departments, providing a stimulus for examining problems in such areas as technology and health care, technology and legal systems, and so on. The engineering departments and the schools of Management, Architecture and Planning, and Humanities and Social Sciences are represented on the steering committee for the Technology and Policy program. Sloan support will be used mainly for curriculum development.

Two M.I.T. research centers which contribute to the breadth of education of M.I.T. engineering students received renewed support under the same grant. The Center for Policy Alternatives, established four years ago, has developed a broad-scale research program which examines the major technology-related issues facing society, assesses the consequences of current prac-

Members of a student task force at Carnegie-Mellon University who studied residential power load management present their findings to an audience which includes public utility representatives and regulators. Task forces are part of the University's Engineering and Public Policy program. Presentation is being videotaped for preservation and analysis.

tices and policies, and identifies the possible alternative courses of action. The Center for International Studies engages in research on the social and technological issues involved in such areas as energy, environment, oceans, communications, arms control and defense, nutrition, planning for development, and science and technology policy. In both centers students are involved in some of the research, and some new courses have emerged from the research collaboration of social scientists and engineers.

For the master's degree program in Technology and Policy, and for administrative and development costs of the two M.I.T. centers, the Foundation made a three-year grant of $655,000 in 1976.

- A separate grant to M.I.T. will support the creation of an undergraduate program in public policy. It will be administered by the Department of Political Science in cooperation with numerous other departments and schools of the Institute. The aim is to afford M.I.T. undergraduates, who tend to be quite sophisticated about science and technology, an understanding of how political, economic, and social decisions evolve, and to respond to "their growing realization and puzzlement that society does not simply adopt and efficiently implement courses of action that 'experts' (such as they are striving to become) deem rational."

M.I.T. students may take a major in public policy, serving internships and preparing theses, but it is expected that most will select public policy as an area for a required non-science concentration or will take a few courses to gain some insight into policy formation. The objective is to equip them to search out and appraise evidence from a wide variety of sources, to think critically about policy issues and the claims made on behalf of policy proposals, and to make sophisticated use of key theories, findings, and analytic approaches that have proven useful in the study of policy formation, implementation, and evaluation.

For the M.I.T. undergraduate program the Foundation is providing $250,000 over two years, much of it to allow faculty members time to develop the new courses and teaching materials which are sorely needed at this point in the development of education for the public service.

Management-Based Programs

- Since 1971 Stanford University has conducted a Public Management Program in its Graduate School of Business. Public management training is offered as an option within the regular two-year Master of Business Administration program; originally the program was focused on urban management, but in 1973 it was broadened to provide training for all levels of government. By 1976 the program had 93 graduates, nearly all of whom had gone into jobs in the public sector, the federal government being the largest employer with 33. Most of the students had had full-time experience in government or other non-profit positions before joining the Stanford program; this experience is augmented by a summer internship with an appropriate agency or organization, and by field projects conducted with government agencies in the region.

By 1976 the Graduate School of Business was ready to propose a series of improvements to enable the Public Management Program to realize its full potential. It proposed to add new courses and develop new public-sector teaching materials, expand the number of joint research projects involving the School and governmental agencies, and increase the number of local governmental officials visiting the School as speakers. The Foundation responded with renewed support of $500,000 over three years.

A public management seminar in Stanford University's Graduate School of Business is led by Alain C. Enthoven, who is Marriner S. Eccles Professor of Public and Private Management. Most students in the program have had previous experience in government.

• Yale University's newest professional school, the School of Organization and Management, admitted its first class of 50 students in the Fall of 1976. The School is attempting a unique synthesis of the educational approaches commonly employed in business schools, public policy schools, and schools of public administration. The intention is to design a program which integrates into a coherent two-year course of study the tools and perspectives of management, policy analysis, and operations within a political environment, producing managers who will be at home in public, private, and nonprofit contexts. In this effort there are few existing materials to fall back on, so much of the early work will be in the development of case studies appropriate to such a mixed program. These cases will serve to expose students to problems of increasing complexity as they proceed through the core curriculum, a central two-year workshop, and "clinical" seminars and internship programs.

Principally for this curriculum development work by faculty members, the Foundation granted $250,000, payable over two years, to Yale's new School.

Public Policy-Based Programs

As education for the public service takes shape as a distinct professional field, in its various settings, the need for case studies and course materials that

are generally useful, as a textbook is generally useful, becomes more pressing. Cases which illustrate in depth real problems faced by practicing managers are expensive and time-consuming to develop, and often do not work well outside the institutions where they originated. Several schools of public policy studies are working to remedy this situation.

- Faculty and graduate students at Harvard University and the State University of New York at Stony Brook are collaborating in preparing case materials in public management with the help of Sloan grants to both universities. The participating entities are Harvard's John Fitzgerald Kennedy School of Government and the W. Averell Harriman College for Urban and Policy Sciences at Stony Brook. The Kennedy School has taken a leading position, partly through past Sloan support, in preparing case studies for use in public policy education; the Stony Brook school will profit from this experience while helping the Kennedy School learn how to make its case materials more readily usable at other institutions. The hope is that materials suitable for broad dissemination to comparable programs will emerge.

For the Harvard-Stony Brook collaboration the Foundation granted $100,000 over two years to Harvard University and the same amount to the Stony Brook institution, the latter grant payable to the Research Foundation of State University of New York.

- The role of technology in education for the public service appears to require more emphasis than it currently receives in most educational programs of the kind under discussion here. The policy maker is repeatedly faced with technological issues—such as the relative emphases to be placed on nuclear and fossil energy—in which the customary recourse is to turn to experts for advice. But this practice abdicates responsibility for policy making to the experts, to some degree, and the policy maker could deal more intelligently with experts if he himself had some capacity to conceptualize and analyze technical information.

A three-university task force intends to tackle the problem of designing a course or courses which deal with technological processes themselves rather than with the economic, legal, organizational, or political aspects of technology. Technology is coming to be recognized as an independent force in public affairs, and public managers, this reasoning goes, must be able to think analytically and critically about it.

To develop the needed graduate course material in this area, Syracuse University's Maxwell School of Citizenship and Public Affairs will form a task force with the Graduate School of Public Administration of New York University and the Harriman College for Urban and Policy Sciences at the State University of New York at Stony Brook. The work will be supported by a two-year Sloan grant of $150,000 to Syracuse University.

Related Activities

• The American Association for the Advancement of Science (AAAS), with some 300 affiliated scientific, engineering, and professional societies, represents perhaps the broadest and most diverse constituency of persons interested in science in academia, industry, and government. It is now preparing to play a larger role in stimulating a public dialogue on the place of science and technology in shaping public policy. Assisted by a 1975 Sloan planning grant, the AAAS has formulated a three-part program which includes preparation of a regular series of papers on science and technology policy issues, for use as a basis for discussion in various forums including an annual mid-year science policy meeting; encouraging the growth and coherence of university-based research and teaching in science, technology, and public policy; and creating an interdisciplinary, interprofessional network of affiliated scientific and engineering societies to respond to needs and problems in the relationship between science and society.

The Foundation made a two-year grant of $100,000 in 1976 to support these expanded functions of the AAAS.

• In June of 1976 the Foundation brought together some 30 persons representing schools of engineering, management, law, public administration, and public policy in a week-long Seminar on Education for the Public Service. One expected outcome of that Seminar will be a book on the field of education for the public service, cowritten by Stephen White, Vice President of the Foundation, and Prof. Joel Fleishman, director of the Institute of Policy Sciences and Public Affairs at Duke University. For further program development arising out of the Seminar and for research and publication costs for the book, Duke University received two grants totaling $24,500. (Duke continues to conduct one of the most active programs in public policy education, offering both an undergraduate major in public policy and a master's degree in public policy concurrently with an advanced degree in another profession such as business administration, engineering, law, or medicine. Support for this program is continuing under a 1975 Sloan grant.)

Three smaller grants were approved in 1976 in the area of public management and public affairs:

Harvard University, Cambridge, Mass. **$4,000**
In support of research and lecture activities of Dr. George B. Kistiakowsky in science and public affairs.

Massachusetts Institute of Technology, Cambridge, Mass. **$15,000**
In support of work of the Political Science Department's News Study Group in making videotapes at the 1976 political party conventions for Public Television use and for M.I.T.'s inventory of research materials.

New York State Legislative Institute, Baruch College, New York, N.Y. **$20,000**
In support of a Conference on State Government Management and Productivity.

Economics and Management

Two important new economics research programs, in the economics of the family and in government regulation of the economy, received Sloan support in substantial amounts in 1976. Grants awarded in 1974 and 1975 for training and research in microeconomics at eight universities continued in effect, and a program in economics for working journalists received renewed support.

Education for the public service, discussed in the preceding section of this Report, absorbed most of the funds available for management education in 1976. All told, new grants described in this section of the Report came to nearly $1.4 million for 1976.

Major New Research Projects

- Recent developments in economic theory, together with improved methods of data collection and analysis, have led to increasing interest in studying the family as a basic economic unit of society. One such development is the theory of human capital, which holds that much of society's productive capacity is embodied in human beings, and that this capital is created through a process akin to investment. Another new approach views households as not merely consumers of goods and services but also as active producers of things of value, for example good health, which cannot be purchased in the marketplace. Both these approaches have led to a heightened awareness of the importance of *time* and how it is spent, both within the family and over the life cycle.

Together with these theoretical advances there has come a significant increase in the quantity and quality of data available for economic analysis, and new statistical theory which, combined with low-cost, high-speed computers, makes possible economic analyses of the family in new depth and detail.

Some say the family is in serious trouble. Certainly it is changing with unprecedented speed, along with the changing status of women. Participation in the labor force of married women with children under six nearly tripled between 1950 and 1974; married women are contributing a growing percentage of family income, while the birth rate has sunk and the divorce rate has soared; the percentage of children under six living with only a mother doubled between 1960 and 1974; and the percentage of single-person households doubled between 1950 and 1970.

The National Bureau of Economic Research believes it would now be fruitful, using the new theoretical and statistical tools, to address some penetrating questions about the family, among them: What determines the division of labor among family members? How do changes in the earnings of one spouse affect the labor force participation of the other? How do changed expectations concerning long-term attachment to the labor force affect schooling and other decisions regarding occupational choice, marriage, and child bearing? How and why does marital status affect the age/earnings profiles of men and women? How and why does marital status affect health? How and why do the relative earnings of women and men affect marriage, divorce, and fertility?

Those and other questions will be studied by the National Bureau's Center for Economic Analysis of Human Behavior and Social Institutions, in Palo Alto, Calif. In this effort to probe deeply into the functions of the family as an institution and its relation to other social institutions, the Bureau's economists will have the cooperation as needed of scholars in demography, law, psychology, and sociology. A two-year Sloan grant of $250,000 will assist the research.

- The efficacy of governmental regulation of economic activities has become a subject of national debate. There is either too much regulation or too little; regulatory agencies are either too hard or too soft on the industries concerned; regulation drives up costs, averts serious damages, or both. What is clear is that regulation has increased over the past decade or so and that a new kind of regulation has emerged, cutting across the entire economy to enforce standards of environmental protection, product and occupational safety, and nondiscriminatory employment.

An effort to develop a comprehensive understanding of regulation—its essential strengths and limitations, its positive and negative side effects in various situations, and its optimal institutional forms—is being undertaken by the American Enterprise Institute for Public Policy Research. The Institute through its new Center for the Study of Government Regulation is assembling a multi-disciplinary community of scholars to conduct long-term studies of all aspects of government regulation and to communicate their findings to policy makers and the public. Included in the Center's purview will be not only the

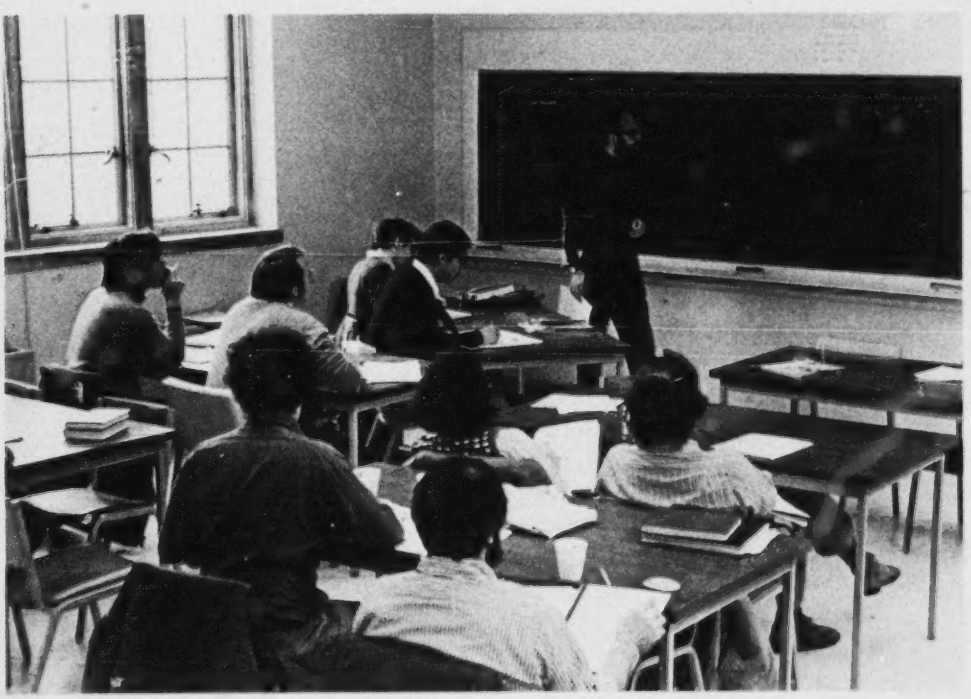
independent federal regulatory agencies and the newer economy-wide regulators, but also regulatory offices within the federal departments and in state governments. Also to be studied is regulation by less direct means, such as taxation, subsidies, direct legislation, antitrust actions, and others. The Center will attempt to develop a methodology for determining benefits and costs of particular regulatory programs.

The ambitious scope of the Institute's plan for the new Center has made multiple funding sources necessary, and several foundations have made major contributions to its support. The Sloan Foundation agreed to provide $500,000 over a three-year period.

Continuing Projects

• A program in economics journalism, conducted by Princeton University's Woodrow Wilson School of Public and International Affairs, was conceived in 1974 in response to what was seen as a widespread lack of under-

Fellows in economics journalism at Princeton University receive a year's exposure to graduate-level economics before returning to reporting duties. Here some of them study urban economics in course conducted by Prof. Edwin Mills. There are eight fellows each year.



standing of pressing economic issues of growing complexity. More highly trained journalists, it was reasoned, were needed to comprehend and explain current economic events, which could not be understood without some background of advanced economic theory. The Woodrow Wilson School agreed to provide such training, beginning in 1975. The program is guided by an internal advisory committee of Princeton faculty and an external advisory board, mostly senior journalists. Frequent use is made of visiting speakers from government and from other universities and research institutions.

A second group of experienced journalists entered Princeton University in the Fall of 1976 to sharpen their skills in analyzing and reporting news of economics and business. The eight Alfred P. Sloan Foundation Fellows in Economics Journalism, averaging 32 years of age, are spending a year of graduate-level study in microeconomics, macroeconomics, quantitive analysis, a special policy workshop in economics journalism, and related economics courses which they and their mentors feel will heighten their ability to interpret economic policies and developments in the public media.

The Foundation in 1976 provided $250,000 for a second year of fellowship stipends, tuition, and operational costs, bringing total support of the economics journalism program thus far to $595,000.

- Florida Agricultural and Mechanical University, cited in the Foundation's Report for 1973 as the leading source of black accountants, has solidified and enhanced that position since then. It draws academically talented students from many parts of the nation and places them after graduation in leading national accounting firms, some of which have endowed chairs in accounting at Florida A. & M. Even while its accounting program has been rapidly expanding, its admissions criteria have become more selective.

During the period since the Foundation's 1973 grant, the University's Department of Business has become the School of Business and Industry, and is moving toward becoming the third business school among traditionally black institutions to gain full accreditation. To achieve that status, and to keep up with the rising enrollment of highly qualified accounting students, new faculty positions were required. The Foundation agreed to underwrite partially five such positions by a matching grant of $100,000 over two years, after which state support for them is expected. In this instance an activity originally supported through the Foundation's expired Particular Program in Medicine and Management for Minorities is receiving extended support under the General Program.

- A study of the economics of higher education, with particular reference to the outcomes of higher education, received a third and final year of partial support in 1976. Dr. Howard R. Bowen, who is R. Stanton Avery Professor of Economics and Education at the Claremont Graduate School, is seeking to bridge a gap between higher-education specialists such as econo-

mists, psychologists, and sociologists, and the decision makers in government, foundations, and university administrations who largely determine the course of higher education. His work is expected to enlighten the continuing debate on the value of higher education as presently conducted.

The Foundation in 1976 granted $60,000 to Claremont University Center for the completion of Dr. Bowen's study.

Economics and the Law

• Partly because of the growth of federal and state regulatory activity referred to above, the relationship of law and economics has become a matter of increasing interest to members of both disciplines. The Law and Economics Center of the University of Miami School of Law was established to provide intensive training in economics for law professors; in 1976 it began to offer a three-week summer institute in law for economists. The first institute attracted 23 young economists, some of them teaching economics in law schools and some doing research on the interrelationships of law and economics. The institute was deemed a success and seems likely to stimulate an increased amount of scholarly publishing in the field; the Center plans to continue and to slightly expand the institutes. The first was supported by a $62,000 grant from the Sloan Foundation.

These other grants were approved in 1976 for projects related to the Foundation's interest in economics and management:

The American Assembly, New York, N.Y. **$20,000**
In support of an American Assembly program on capital formation.

American Economic Association, Nashville, Tenn. **$20,000**
For a summer program to increase the number and educational opportunities of minority students in economics.

Bentley College, Waltham, Mass. **$20,000**
For development of a curriculum in accounting and financial management for elected officials and mid-career employees in local government.

Catalyst Inc. **$20,000**
In support of the Catalyst National Roster—a categorized and computerized compilation of women seeking managerial, technical, or professional positions.

Dartmouth College, Hanover, N.H. **$15,000**
In partial support of the Consortium on Financing Higher Education's study, *The Effect of Rising Costs on College Choice*.

Duke University, Durham, N.C. **$5,660**
For support of a workshop, sponsored by the Operations Research Society of America, on models for the introduction of operations research/management sciences in newly developed and developing institutions.

Educational Change, Inc. **$20,000**
For partial support of a two-year pilot project in the preparation and publication of annual financial surveys of higher education and of individual institutions.

Public Communication Foundation for North Texas, Dallas, Tex. **$20,000**
For partial support of the research and development phase of a proposed television series on the economy, *The American Gift*.

University Centers for Rational Alternatives, Inc., New York, N.Y. **$20,000**
For partial support of UCRA's 1976 conference on the relationships between the federal government and institutions of higher education.

Urban Academy of the City University of New York **$16,125**
In support of the planning of a new management training program for New York City employees (paid to Research Foundation of the City University of New York).

Science and Technology

Efforts to stimulate applications of mathematics and to expand knowledge of the history of science were conspicuous among the scientific matters to which the Foundation devoted attention in 1976. Activities in science and technology, including the Particular Program in Neuroscience (see Page 46) and the Sloan Fellowships for Basic Research, have regularly commanded a major portion of the Foundation's resources.

Applied Mathematics

• Thoughtful mathematicians for many years have remarked on the desirability of a closer relationship between the two major divisions of their discipline, the pure and the applied. Methods developed in pure mathematics have found some striking and unexpected applications in recent years, and the time may be at hand at last for significantly narrowing the gap between the two divisions. Yet the scope of these powerful new applications is not adequately represented in the courses offered by the mathematics departments of most colleges and universities. The result is that the student whose career interests lie in using rather than creating mathematics may have difficulty finding courses that both challenge him intellectually and prepare him for the practical work of laboratories, industry, and business.

The National Research Council of the National Academy of Sciences is forming a Committee on Applied Mathematics Training to make detailed recommendations on the expansion of the applied mathematics curriculum in the undergraduate programs of colleges and universities. The effort has the support of leading societies of mathematics educators, researchers, and users. The new committee will seek to determine the nature of suitable applied mathematics training, the special efforts that may be needed to gain acceptance of new curricula, the potential for employment of graduates of the new training, and

what programs may be needed to train existing faculty to teach applied mathematics. In developing recommendations on these and other matters, the committee will take special care to see that they are widely disseminated and will discuss them in advance of publication with influential persons in the mathematics community.

The Committee on Applied Mathematics Training is being supported by a Sloan grant of $66,550 to the National Academy of Sciences.

- One of the fields in which mathematics is becoming increasingly useful is environmental health, where masses of data can yield important clues when subjected to sophisticated mathematical analysis. The Institute for Mathematics and Society of the Society for Industrial and Applied Mathematics (SIAM) is mounting a major three-year project in which the skills of mathematicians, particularly statisticians, will be applied to such matters as pollutant distribution and its relation to health and mortality statistics. The project is related to the SIAM Institute's "transplant" program in which mathematicians are placed in medical schools, for example, to develop new applications and specialties in mathematics.

Participants in the SIAM study will be mathematicians in the Department of Statistics at Stanford University and the Division of Biostatistics of Columbia University's School of Public Health. The project's $1 million budget is being raised from various foundations and government agencies; the Sloan Foundation made a three-year grant of $88,000 to the SIAM Institute for Mathematics and Society, which will provide general oversight, coordination, and evaluation.

The History of Science

- At a time of heightened questioning of the institutions of society, the institution of science has come under increasing evaluative scrutiny. A group of faculty members at the University of Colorado—scientists, historians, philosophers, and psychologists—has taken note of this growing interest among both science and non-science students, and is seeking to respond to it. With the aid of a $35,000 Sloan grant to the University, they are now conducting a year-long seminar to develop a comprehensive series of courses in the history of science which will reflect all of their diverse and specialized perspectives on the subject. A regional conference on the teaching of history of science is planned, and the University will create a new faculty position in history of science. The objective is not to train historians of science, but to foster a historical and critical awareness of science in the University.

- The growth of American physics and astronomy in the twentieth century is a phenomenon resulting from many cultural and intellectual forces which are not fully comprehended. Immigration of scientists from Europe and elsewhere, spurred by World War II and the events that led up to it, was an

important factor, but there seems also to have been an enormous growth of native talent which helped propel the nation to its present eminence in physics. Just how this all occurred may be illuminated by a project being undertaken by the Center for History of Physics of the American Institute of Physics. The Center is creating an oral history of American physics in this century, based upon interviews with surviving pioneers in the field, which will be added to its present extensive library and archives. A three-year Sloan grant of $50,000 to the American Institute of Physics is helping to support the work.

Basic Research

• The Foundation's program of fellowship support for creative young scientists entered its 22nd year in 1976, and the number of persons who have been assisted by it reached 1,311. Of that number, 91 were new fellows selected in 1976, and another 86 were receiving support granted in earlier years. Since the program began in 1955 the Foundation has allocated some $26.5 million for fellowships at 148 institutions in the United States and Canada. Currently the annual appropriation for the program is $1.55 million.

The Sloan Fellowships for Basic Research, as their rather long history suggests, appear to the Foundation to be continuing to fulfill a need which still is not well met by other sources of funds. This is the need of the beginning scientist, often in his or her first faculty appointment, for even a limited amount of "free" money which can be flexibly and selectively applied to those research requirements which seem most pressing. These may include technical assistance, the ability to employ a predoctoral or postdoctoral fellow, computer time, professional travel, summer support, occasionally a reduced teaching load, a relatively small piece of equipment, and laboratory supplies. The fellowship awards average $17,500 over two years, and the flexibility which they permit is said to enhance their value.

The Foundation does not accept direct applications for the fellowships, and it does not require research proposals. Nominations of young scientists of outstanding potential come to the Foundation from senior scientists and are reviewed by a Program Committee of two distinguished scientists from each of the four fields covered (physics, mathematics, chemistry, and neuroscience). Once a fellow has been selected he is free to pursue whatever research is of greatest interest to him and, so far as the Foundation is concerned, he may shift the direction of his research at any time.

It is through this means, by conferring a measure of freedom and flexibility (and recognition) on brilliant young researchers in their most creative years, that the Foundation believes fundamental advances in new knowledge are most likely to occur.

Current members of the Program Committee, who are responsible for reviewing some 500 nominations a year, are:

Dr. T. D. Lee, Professor of Physics, Columbia University, Chairman.

Dr. William M. Fairbank, Professor of Physics, Stanford University.

Dr. Jurgen Moser, Professor of Mathematics, New York University.

Dr. Francis O. Schmitt, Neurosciences Research Program.

Dr. I. M. Singer, Professor of Mathematics, Massachusetts Institute of Technology.

Dr. Eliot Stellar, Provost, University of Pennsylvania, a neuroscientist.

Dr. Gilbert Stork, Professor of Chemistry, Columbia University.

Dr. John S. Waugh, Professor of Chemistry, Massachusetts Institute of Technology.

(Drs. Fairbank, Moser, Stellar, and Waugh were appointed to the Program Committee early in 1977.)

Sloan Research Fellows selected in 1976, their institutions, and their fields of science, are:

University of Arizona
Chemistry: M. Bonner Denton
Physics: George H. Rieke, Richard L. Shoemaker

Bowdoin College
Mathematics: John D. Fay

University of British Columbia
Chemistry: Alan G. Marshall

California Institute of Technology
Chemistry: John E. Bercaw, W. Henry Weinberg
Neuroscience: Albert J. Hudspeth

University of California, Berkeley
Chemistry: K. Peter C. Vollhardt
Mathematics: Leo A. Harrington, Arthur E. Ogus
Neuroscience: Robert S. Zucker

University of California, Irvine
Chemistry: Mario J. Molina

University of California, Los Angeles
Chemistry: Eric J. Heller
Mathematics: Richard Elman, Mark L. Green

University of California, Riverside
Neuroscience: Richard W. Olsen

University of California, San Diego
Mathematics: James P. Lin

University of California, San Francisco
Neuroscience: Stanley B. Prusiner, Jennifer H. Lavail

University of Chicago
Neuroscience: Paul Grobstein
Physics: Lawrence Grossman, Kathryn Levin, Robert M. Wald

College of William and Mary
Chemistry: Eric Herbst
Physics: Carl E. Carlson

Colorado State University
Physics: Alan K. Betts, William M. Fairbank, Jr.

University of Colorado
Mathematics: Martin E. Walter

University of Colorado Medical School
Neuroscience: Francisco J. Varela

Columbia University
Chemistry: Walter G. Klemperer
Neuroscience: James P. Kelly

Cornell University
Mathematics: Dan Kubert
Physics: John B. Kogut

Dartmouth College
Chemistry: Robert Ditchfield
Physics: P. Bruce Pipes

University of Florida
Neuroscience: William G. Luttge,
Steven F. Zornetzer

Harvard University
Chemistry: Bennie R. Ware
Physics: Eric J. Chaisson,
Howard M. Georgi III

University of Illinois, Urbana-Champaign
Chemistry: David N. Hendrickson

Indiana University
Chemistry: Attila Szabo

Iowa State University
Chemistry: Philip M. Warner

Johns Hopkins University
Chemistry: Paul J. Dagdigian
Physics: Arthur F. Davidsen

Massachusetts Institute of Technology
Chemistry: Richard R. Schrock,
Edward I. Solomon
Physics: John D. Joannopoulos, Paul C. Joss
Neuroscience: Michael A. Moskowitz

Michigan State University
Chemistry: Robert I. Cukier
Physics: Robert G. H. Robertson

Middlebury College
Physics: P. Frank Winkler

University of Minnesota
Physics: Roberta M. Humphreys

State University of New York, Stony Brook
Chemistry: Jimmie D. Doll
Mathematics: Henry B. Laufer

Northwestern University
Physics: George K. Wong

Ohio State University
Chemistry: John M. Parson

University of Pittsburgh
Chemistry: Julius Rebek, Jr.

Princeton University
Chemistry: Malcolm H. Chisholm,
Jeffrey Schwartz
Mathematics: Jurg M. Frohlich,
Allen E. Hatcher
Physics: Frank A. Wilczek

Purdue University
Chemistry: Steven Adelman
Physics: Bernard A. Weinstein

Rice University
Physics: F. Barry Dunning
Mathematics: Michael E. Taylor

University of Rochester
Chemistry: Thomas F. George,
Thomas R. Krugh

Rockefeller University
Mathematics: Thomas C. Spencer
Neuroscience: Sarah F. Leibowitz

Rutgers University
Mathematics: Jean E. Taylor
Physics: Haruo Kojima

Salk Institute
Neuroscience: Steven J. Henriksen

University of Southern California
Chemistry: Christopher A. Reed

Stanford University
Chemistry: Keith O. Hodgson

University of Tennessee
Neuroscience: John G. Wood

Texas A&M University
Physics: Robert E. Tribble

Washington University
Neuroscience: Robert C. Collins,
Edward V. Famiglietti, Jr.

University of Washington
Chemistry: Weston T. Borden,
Nicolas D. Epiotis
Physics: Paul E. Boynton

Wayne State University
Chemistry: Robert K. Boeckman, Jr.
Physics: Talbert S. Stein

University of Wisconsin, Madison
Mathematics: Linda P. Rothschild

Yale University
Chemistry: Thomas Keyes
Mathematics: James Lepowsky
Physics: Itzhak Bars

• The Sloan-Kettering Institute for Cancer Research, established with Sloan Foundation support in 1945, continued in 1976 to investigate the mysteries of cancer across a wide range of biological sub-disciplines. The study of molecules on cell surfaces is yielding new insights into how communities of cells behave, or in the case of cancer, misbehave. The relationship of viruses to cancer, the role of the immune system in fighting cancer, and a possible genetic basis of cancer all are being studied in the search for new pieces to the cancer puzzle. At the same time, the Institute serves as a training ground for future cancer researchers through its program for postdoctoral fellows. Its close relationship with Memorial Hospital for Cancer and Allied Diseases, through Memorial Sloan-Kettering Cancer Center, assures that research findings are translated promptly into new forms of treatment for cancer patients.

The Foundation has made annual contributions for research at the Sloan-Kettering Institute since the Institute's founding, along with occasional major grants for new facilities required by the Institute's expanding operations. For 1976 the Foundation's contribution was $600,000, which included $400,000 committed earlier. This was about 2 per cent of the Institute's total budget, of which about three-fourths is provided by federal health-research agencies.

Technology and the Performing Arts

• A possible solution to the persistent financial problems of the nation's cultural institutions is being tested by Lincoln Center for the Performing Arts in New York City. The Center's Media Development Department is experimenting with live telecasts of concerts, opera, and ballet with the ultimate goal of creating a network of paying subscribers who would contribute substantially to reducing or eliminating the Center's annual deficits.

The initial "Live From Lincoln Center" programs are being broadcast over a network of public television stations; the Center's marketing plan calls for distribution in time by some form of pay television, probably involving satellite and cable transmission. The Sloan Foundation through a 1973 grant supported research and development to solve some of the technological problems of live telecasting from a concert hall or opera house. A two-year grant of $189,000 approved in 1976 will support further development, specifically of equipment to expand the range of lighting conditions which the system can accommodate, and of a sound-security device to deliver the audio portion of the telecast (which is high-fidelity stereo sound) only to future paying subscribers.

Book Program

• In years past the Sloan Foundation has supported several efforts to improve public communication about science, technology, economics, and closely related areas in which the Foundation is operative. These efforts have included advanced training programs for journalists, educational films, and what is now called the science information movement. While most of these activities have been helpful in maintaining some public awareness of the methods, goals, and values of these intellectual disciplines, it is evident that much more remains to be done. Foundation Trustees have now authorized the officers to undertake a new approach—the commissioning of about 15 books, by eminent scholars in the fields in which the Foundation is active, about their work as a humanistic and cultural endeavor. The authors are being asked to concentrate not on the *results* of work in a particular discipline but on the nature of the intellectual enterprise that culminated in those results. The hope is to enlighten the serious adult reader as well as the bright undergraduate and graduate student about the manner in which advances in knowledge affect the individual's sense of his place in nature and his relation to the universe of which he is a part. The tangible outcome is to be a coherent series of books, commercially published.

The Trustees during 1976 appropriated for this undertaking $350,000, principally to support research and writing during the first three years of the program. The funds also will support the work of an editorial Advisory Committee, chaired by Dr. Robert L. Sinsheimer, chairman of the Division of Biology at California Institute of Technology, which is monitoring the progress of each separate project and issuing invitations to other prospective authors. Other members of the committee are: Dr. Howard Hiatt, Dean, Harvard School of Public Health; Dr. Mark Kac, Professor of Mathematics, Rockefeller University; Mr. Winthrop Knowlton, President, Harper & Row, Publishers, Inc.; Dr. Daniel McFadden, Professor of Economics, University of California, Berkeley; Dr. Robert Merton, University Professor, Columbia University; Dr. George Miller, Professor of Experimental Psychology, Rockefeller University; Dr. Philip Morrison, Institute Professor, Massachusetts Institute of Technology; Dr. Frederick E. Terman, Provost Emeritus, Stanford University.

It is anticipated that this series of publications will be completed within five years.

Other grants for activities in science and technology in 1976:

American Association for the Advancement of Science, Washington, D.C.

For partial support of the AAAS Congressional Science and Engineering Fellows program. **$20,000**

For a symposium at the AAAS annual meeting on barriers to professional development for women in science. **$1,460**

University of California, Santa Cruz, Calif. **$20,000**
For support of a graduate program in photochemistry.

University of Colorado, Boulder, Colo. **$7,380**
In support of the University's 1976-77 Science in the Public Interest Lectures and Science News Writing Seminar.

Columbia University, New York, N.Y. **$4,800**
To support for two years the interdisciplinary Columbia Science Colloquium for science faculty members.

East Asian History of Science Trust, Cambridge, England **$20,000**
Toward support of the scholarly work of Dr. Joseph Needham in ancient Chinese science and technology.

University of Georgia, Athens, Ga. **$20,000**
In partial support of a project on studies in stochastic systems at the University's Center for Applied Mathematics.

Harvard University, Cambridge, Mass. **$10,826**
To underwrite the costs of preparing a paper on science for a meeting of university presidents and foundation executives concerned with the future of the nation's major research universities.

International Baccalaureate North America, New York, N.Y. **$16,000**
To support revision and expansion of the International Baccalaureate's syllabus and examinations in the natural sciences.

Massachusetts Institute of Technology, Cambridge, Mass.
For partial support of a conference on the teaching of physics to students majoring in other science and engineering fields. **$15,000**

For support of a research project on blacks in American science and technology. **$20,000**

In support of a project on Work in Technology and Science. **$20,000**

National Academy of Sciences, Washington, D.C.
For renewed partial support of a series of Academy Forums on science and its relevance to public policy. **$5,000**

To help defray expenses of a two-day symposium marking the 30th anniversary of the Office of Naval Research. **$10,000**

Princeton University, Princeton, N.J. **$15,000**
For partial support of preparation of the second edition of Prof. Fritz Machlup's book, *The Production and Distribution of Knowledge in the United States.*

Stanford University, Stanford, Calif. **$20,000**
In support of research and development for a proposed film series based on Dr. Lewis Thomas' book, *The Lives of a Cell.*

Particular Programs

Minority Engineering Education

The Particular Program in Minority Engineering Education assumed fully national dimensions in 1976 with the establishment of a national curriculum-development center for pre-engineering education and the complete activation of a consortium of engineering schools in the Southeastern region. The program's focus is now very largely on preparation at the secondary-school level for future engineering studies; however, an effort also is under way to increase the number of minority engineers holding graduate degrees, and a national consortium has been formed for that purpose.

New commitments under the Particular Program in 1976 exceeded $2.7 million, the highest level in the program's three-plus years, bringing aggregate commitments thus far to $6.7 million. The program is expected to continue for three more years.

The program was conceived at a time when blacks and other minorities (Chicanos, Puerto Ricans, native American Indians) numbered only 2.8 per cent of all practicing engineers; a Sloan-supported task force in 1974 set as a goal for 1982 a minority representation among first-year engineering students of 18 per cent, equal to the four minority groups' projected share of the college-age population in that year.

Enrollment of minority engineering freshmen in the Fall of 1976 continued to run ahead of optimistic projections made by the Sloan task force in 1974; but because overall freshman engineering enrollment far exceeded expectations, the increase in the minority percentage was limited, from 7.1 per cent in 1975 to 7.7 per cent in 1976. Perhaps most encouraging was the absolute growth in numbers of minority freshmen, from 5,344 in 1975 to 6,309 in 1976, an increase of 18 per cent, about double the rate of increase for all engineering freshmen.*

* Source: Engineering Manpower Commission of Engineers Joint Council. Comparisons are based on revised data for 1975.

No one factor accounts for these gains toward equity in the profession of engineering. Rather, they are the result of a growing effort involving engineering colleges, public schools, professional societies, industry, government agencies, foundations, and specially created entities. Among the latter is The National Fund for Minority Engineering Students, established in 1975 to help overcome the most serious obstacle to increasing minority engineering enrollments, lack of adequate student financial support. The Foundation made a three-year grant for administrative support of the Fund in 1975.

Secondary-School Efforts

One of the attractive features of engineering study for minority groups (or for anyone) is that it normally leads to a professional degree and relatively well-paid employment after just four years of college. This of course means that pre-engineering study, unlike pre-medicine and pre-law, takes place in secondary schools; and, because engineering is among the most rigorous courses of study offered by most colleges and universities, the quality of the student's high-school preparation for it becomes crucial. This fact is now widely recognized and has given rise to programs in a number of regional consortia and individual institutions, to try to insure that incoming minority engineering freshmen with a reasonable chance to succeed will become more numerous.

- Helping secondary schools across the nation to prepare students—especially minority students—more effectively for engineering study is the mission of the National Coordinating Center for Curriculum Development (NCCCD), established early in 1976 at the State University of New York at Stony Brook. Its director is Dr. John G. Truxal, formerly dean of the University's College of Engineering and Applied Sciences, in which NCCCD is based as part of the College's Program on Technology and Society. A Sloan grant of $765,000 (paid to the Research Foundation of the State University of New York) is supporting the curriculum center's first year of operation, and further support is planned.

Among the Stony Brook center's numerous functions, the central one is developing engineering-oriented educational materials and getting them introduced and tested in secondary schools in urban centers with large minority populations. To begin this work, the center in the summer of 1976 convened an eight-week curriculum-development workshop at which faculty members from 14 high schools and seven engineering colleges across the nation joined forces to produce some 30 learning modules. Some 24 of these are now in use and more are on the way. The modules, which may consist of tapes and slides as well as printed materials, are in the subjects of science, mathematics, and the all-important skills of communications. They are designed to be woven into regular high-school courses as the teacher sees fit, or taught as a unit of about

ten class periods. Other materials are primarily informational and motivational, intended to answer questions about the engineering profession for students, parents, guidance counselors, and school administrators.

To get these materials into use, NCCCD has created a growing network of inner-city high schools, each associated with an engineering college in its area which helps the schools learn to use the modules emanating from Stony Brook. Currently participating are about 35 secondary schools in eight cities—New York, Washington, D.C., El Paso, Houston, Boston, Atlanta, Chicago, and Philadelphia. The number of cities and schools involved will be expanded during 1977. In areas where there are consortia of engineering schools concerned with minority students, NCCCD works in cooperation with them. The intention is to create a number of regional curriculum-development centers which will produce materials adapted to local needs.

Evaluation of the Stony Brook materials will assume growing importance as they come into wider use. Through a process of feedback from the schools, improvements in them will be made and the most fruitful approaches identified. The center's sizable staff is in frequent contact with the participating schools and colleges, and indeed with virtually every organization (some of them mentioned below as recent grantees) concerned with minority engineering education. Efforts are under way to elicit greater interest from industry and government. Community involvement is emphasized in each area, and special materials to stimulate it are disseminated.

Thus the Stony Brook center is both an educational research and development laboratory and a catalyst for other activities in its designated area of concern. Its efforts, added to all of those previously under way, seem likely to lead to accelerated progress toward the common goal.

- A program specifically linked to the work of the Stony Brook curriculum center is being initiated by the Southeastern Consortium for Minorities in Engineering with a two-year Sloan grant of $500,000 (paid to Georgia Tech Foundation, Inc.). Members of the Consortium, some of which received preliminary Sloan support in 1975, are the University of Alabama, Tuscaloosa; University of Florida, Georgia Institute of Technology, University of South Carolina, Tennessee State University, University of Tennessee, Knoxville; and Tuskegee Institute.

The Consortium's effort will be directed toward introducing the Stony Brook curriculum materials into secondary schools of the Southeast, which are said to enroll 40 per cent of all black high-school students. Initially four regional conferences are being held with leaders of some 75 school systems to explain the work of the Consortium and the Stony Brook center. The systems are being invited to submit proposals for implementing pre-engineering curriculum programs, and it is expected that 35 of them will be selected to participate.

Stony Brook staff will train participating teachers during a two-week summer session, and use of the materials will begin in the fall of 1977, with engineering and education faculty from Consortium members advising and assisting. Early in 1978 the Consortium and the Stony Brook center will evaluate the program and develop plans for its modification and expansion. During the projected three years of the program an estimated 150,000 minority high-school students will be in one or more classes in which the new materials are used.

- Aided by a two-year Sloan grant of $750,000 awarded in 1975 to the Committee on Institutional Cooperation (CIC), 14 Midwestern universities are seeking in a variety of ways to identify minority students having an aptitude for engineering, to help their schools develop that aptitude, and to enroll them as engineering students. The 14 schools enroll about 30 per cent of all engineering students, and they have recently been joined by Wayne State University and the University of Detroit. CIC is an academic consortium consisting basically of the Big Ten universities and their various campuses; in the program called CIC + MPME (Midwest Program for Minorities in Engineering) the "plus" refers to the Illinois Institute of Technology, the University of Notre Dame, and now the two Detroit institutions.

While the 1975 grant has yet to expire, experience indicates that immediate beneficial results could be obtained by an accelerated effort in the Chicago area and, a little later, in Detroit. In Chicago the four responsible universities—Illinois Institute of Technology, Northwestern University, and the University of Illinois' Urbana-Champaign and Chicago Circle campuses—were ready to expand rapidly their collaborative effort to embrace some 8,000 students in about forty secondary schools having minority enrollments over 50 per cent. The four-university collaboration in Detroit—the Universities of Michigan and Detroit, and Michigan State and Wayne State Universities—is newer, but planning is going forward and the expansion to a city-wide program should occur by 1978. It is expected that the best features of the Chicago program, as experience reveals them, will be incorporated in the Detroit program.

For the expanded CIC + MPME effort in Chicago and Detroit the Foundation made a two-year grant of $397,450, payable to Northwestern University.

- Perhaps the most intensive regional minority-engineering effort exists in the Philadelphia area, where PRIME (Philadelphia Regional Introduction for Minorities to Engineering) brings together eight colleges and universities (Drexel, Lincoln, Temple, and Villanova Universities; the University of Pennsylvania; Widener and Spring Garden Colleges, and the Community College of Philadelphia); the school districts of Philadelphia, Camden, and Chester Upland; and twenty business corporations, professional societies, and community groups. Some 750 pre-college students and 240 college students are in-

volved in various phases of PRIME's activities to increase minority engineering enrollments and graduates.

During 1977 PRIME will bring about the introduction into a large number of Philadelphia schools of the pre-engineering materials being developed by the National Coordinating Center for Curriculum Development at Stony Brook. PRIME and its member engineering schools will work with teachers and schools and will closely monitor the pilot phase of the project. In the summer of 1977 PRIME and the Stony Brook center will conduct a workshop to introduce the new curriculum modules to teachers from a wider area. For these purposes and for administrative support of PRIME, the Foundation granted $125,000, a continuation of support begun in 1975 with a grant of $60,000.

- An opportunity to stimulate the flow of Mexican-American or Chicano youths into engineering schools exists at the University of Texas at El Paso, a growing institution with a 35 per cent Chicano enrollment. The University's College of Engineering is working with the two independent school districts in El Paso County, each of which has a majority of Chicano students.

Chicano engineering students attend a laboratory demonstration at the University of Texas at El Paso as faculty members look on. The University is working to increase its annual minority enrollment of engineering freshmen from 100 to 160 with Sloan assistance.

to encourage interest in and preparation for engineering study. Some 6,500 students a year graduate from the two districts.

Over the next three years, University engineering faculty members will be assisting high-school teachers of science, mathematics, and English in incorporating into their courses the new materials being developed at the Stony Brook curriculum center. Each summer a two-week workshop for 20 teachers will be held at the University to introduce the Stony Brook materials. Also, the University will conduct two-week summer programs for high-school freshmen and sophomores; strengthen its tutoring program for engineering students, and disseminate information about the engineering profession to the community. By these means it hopes to increase the number of Chicanos entering its engineering school each year from 100 to 160. It is also expected that some El Paso students will be motivated to enter other schools of engineering.

For these activities the Foundation made a three-year grant of $241,000 to the University of Texas at El Paso.

- Marquette University received renewed support of $75,000 for a program conducted with Inroads, Inc., which assists Milwaukee minority students all the way from the ninth grade to an engineering degree at Marquette. During the secondary-school years students do extra academic work, attend a summer session, go on field trips, and visit with corporate engineers. Those who complete this phase are admitted to Marquette with a guarantee of full financial aid and summer jobs with sponsoring corporations. The number of students participating grew from 30 to 45 in 1976 and is expected to reach 60 in 1977.

Inroads, Inc., established in 1969, has developed productive relationships with the higher education community, the business community, and the public schools in a number of cities besides Milwaukee, including Chicago, St. Louis, and Cleveland. Several hundred students and more than a hundred business firms are involved in its projects. A substantial part of its support comes from business.

- Since 1974 the Engineers' Council for Professional Development (ECPD) has sponsored a program of two-week summer sessions on college campuses for minority students who have completed their junior year of high school. The program, called MITE (Minority Introduction to Engineering), has reached a level of more than 1,200 students on some 30 campuses each summer, and seems to be having the desired effect. A survey of the first group of students (the 1974 group) found that in 1975 some 80 per cent were enrolled in engineering schools; before they attended the MITE program only 52 per cent were inclined toward engineering. Incidentally a sizable fraction, about two fifths, of MITE participants are females.

The MITE program is largely supported by industry and to a lesser degree by government and foundations. The Sloan Foundation provided $190,000 for

the 1975 program; for 1976 the Foundation made a contingent grant to ECPD of $90,000 which was matched by substantially larger funds from industry.

Graduate Programs

While programs such as those described above are having a significant impact on the number of minority high-school students who are qualified to enter and succeed in engineering schools, at the opposite end of the educational spectrum, the graduate level, the picture remains bleak. In a recent year only about 1 per cent of all master's degrees in engineering were awarded to minority students, and for Ph.D.'s the minority share was less than 1 per cent. Thus the minority engineering student sees few, if any, faculty members of his own ethnic background, and this makes it more difficult to convince him that opportunities in engineering are open to him. The Foundation in 1976 provided support for two efforts to remedy this situation.

- The National Consortium for Graduate Degrees for Minorities in Engineering, Inc., established in 1975, is a collaborative effort of 19 engineering colleges and nine industrial and governmental members, based at the University of Notre Dame.* Its goal is to increase by 100 each year the number of minority students receiving master's degrees in engineering. This would qualify them for research positions in industry and government laboratories, or for programs leading to the Ph.D.

The Consortium selects students in their junior undergraduate year, after which they are employed for the summer by one of the participating laboratories or companies, with close guidance by an experienced engineer. During their senior year they apply to one or more of the participating graduate schools, and after admission they are supported financially until they attain the master's degree. While in graduate school they continue to work in laboratories or industries during the summers.

Each member laboratory or company contributes $15,000 a year to the Consortium, and the universities also make substantial contributions. In order to expand the program more rapidly than would otherwise be possible, the Consortium requested and received a three-year Sloan grant of $450,000, payable to the University of Notre Dame.

- A program designed specifically to increase the number of minority engineering teachers is getting under way at the University of Michigan College

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* Participating universities include the California, Georgia, Illinois, and Massachusetts Institutes of Technology; Tuskegee Institute; Arizona State, Boston, Cornell, Howard, Johns Hopkins, North Carolina A & T, Purdue, Rice and Stanford Universities, and the Universities of Florida, Illinois, Michigan, Notre Dame, and Texas.

Participating laboratories and companies include Argonne National Laboratory, Bell Telephone Laboratories, Jet Propulsion Laboratory, Johns Hopkins Applied Physics Laboratory, Oak Ridge National Laboratory, Sandia Laboratories, Savannah River Laboratory, Stanford Linear Accelerator Center, and Atlantic Richfield Company.

of Engineering. Beginning in 1977, the College will conduct an eight-week summer program for about 25 selected minority students who have completed their sophomore or junior year at one of the Big Ten or traditionally black engineering colleges. The emphasis will be on fostering in them two essential characteristics of good engineering teachers: intellectual curiosity that leads to an interest in research, and the capacity to communicate the results of such research. Each student will be assigned to work in a faculty research project, and will be trained in preparing reports, proposals, and oral briefings. Additionally, students will be coached on how to prepare and apply for graduate school, and will have an opportunity for practice teaching. Six hours of academic credit will be awarded on successful completion of the summer program.

The Foundation made a grant of $80,000 to the University of Michigan in support of the first year of the program.

These other grants were awarded in 1976 for efforts in minority engineering education:

University of California, Berkeley, Calif. **$2,750**
For partial support of explorations looking toward expansion of the MESA (Mathematics, Engineering, Science Achievement) program for minority high-school students.

Freedom House, Inc., Roxbury, Mass. **$7,500**
In support of a program to identify, recruit, and help prepare minority high-school students for engineering education.

Polytechnic Institute of New York, Brooklyn, N.Y. **$10,000**
For partial support of a longitudinal study of retention, performance, and career development of blacks in engineering.

Western Institute for Science and Technology, Waco, Tex. **$19,800**
For consulting services to the High School for Engineering Professions in Houston, Tex.

Technology in Education

At the close of 1970 the Foundation reached a decision to embark on a third Particular Program, designed to explore the potentialities of technology for enhancing the effectiveness and perhaps helping to control the rising costs of education. Six years, eighty grants, and eight million dollars later, grant making under this program has been brought to an end.

The program was a broad one, embracing technologies as diverse as the interactive computer and the programmed text, and academic disciplines as varied as music and genetics. About the hundreds of educational experiments stimulated by this program, obviously no general statements can be made; their effectiveness will be judged by the extent to which they are incorporated into the regular instructional activities of academic departments, schools, and institutions. And, strictly speaking, the Particular Program is not yet concluded, because some projects supported by it are still in progress; several were initiated in 1976.

Cable on Campus

Early in the program it appeared desirable to establish one or more sizable centers of research and development where new ideas in educational technology could be put into use, evaluated, and demonstrated. There was also considerable interest in the concept of the "wired campus," with principal centers of activity connected by a broad-band coaxial cable for transmission of television and other forms of electronic information. These interests converged at two leading institutions, Dartmouth College and Massachusetts Institute of Technology.

- The Foundation's first major "wired campus" grant, of $600,000 in 1973, has enabled Dartmouth College to complete the first stage of a two-way cable television system connecting all of the major buildings on campus, and

to launch a variety of educational experiments in numerous subject areas. A central administrative entity, the Office of Instructional Services and Educational Research (OISER), has been created to manage the cable system and to provide technical services, advice, and funding for faculty members interested in applying technology to their instructional work.

The Dartmouth cable system makes possible the sending of video programming to major points on campus both from a central studio and from any of twenty-one locations where lectures, seminars, and sports and cultural events are taking place. Initially two channels are being used several hours a day, but the system's great capacity insures that time and channel space will be available for almost any foreseeable demand. A separate cable installed at the same time will make possible increased efficiency and lower cost in the operation of Dartmouth's extensive campus computer system.

Apart from the cable operation, Dartmouth faculty members have pioneered a number of significant developments in educational technology, some of which may spread to other institutions. One of them is a computer-music synthesizer system which has enabled the music department to expand enrollments in theory and fundamentals of composition. A minicomputer in the Thayer School of Engineering, connected by its own cable to terminals in the music department, accommodates four students simultaneously for drills and composition exercises. The system also has been used for advanced composition by serious composers. In other departments, a system of video instruction in languages has proved successful, and major educational technology projects were developed in art history and mathematics.

In numerous other disciplines, Dartmouth scholars have conducted experiments using educational technology and are eager to do more. OISER, directed by Prof. William Smith, selects proposed projects for initial support, assists in their development, and evaluates the results. In some cases substantial development funds are obtained from other foundations.

Dartmouth thus has established considerable momentum in demonstrating ways in which technology can be used to enhance an educational program already of high quality. To help sustain that momentum, and to continue development of the campus cable system, the Foundation in 1976 made a second grant, $323,000, payable over three years.

- Work on a campus cable television system at Massachusetts Institute of Technology has gone forward with the aid of a $620,000 Sloan grant awarded in 1974. By September of 1976 a first-phase system was in operation, carrying two channels of daily programming to dormitory common rooms, classrooms, laboratories, auditoriums, and offices. And scores of students and faculty members were involved in developing their own ideas for instructional, public-affairs, and creative programs.

As at Dartmouth, the M.I.T. system has a large reserve capacity and has

a two-way capability which permits program origination at points where events such as concerts, athletic contests, small seminars, and laboratory demonstrations are occurring. The system extends to dormitory buildings, and some individual students' rooms are being connected to it by the students.

M.I.T.'s Center for Advanced Engineering Study, where the cable system is based, provides equipment, instruction, and assistance for faculty members who wish to experiment with the use of video techniques for their courses. Its hope is that the academic departments in time will become regular users of the system and will pay enough in fees to support it. Other institutions and industries in the Boston-Cambridge area are interested in being connected to the system; thus it may serve to establish firmer links between M.I.T. and the surrounding community.

Further development of the M.I.T. cable operation will involve increased program production, eventual creation of two-way communication with M.I.T. computers via the cable (perhaps from students' rooms), and of course expansion of the number of outlets both on and off campus. To help support this continued growth, the Foundation made a second grant, $490,000, in 1976.

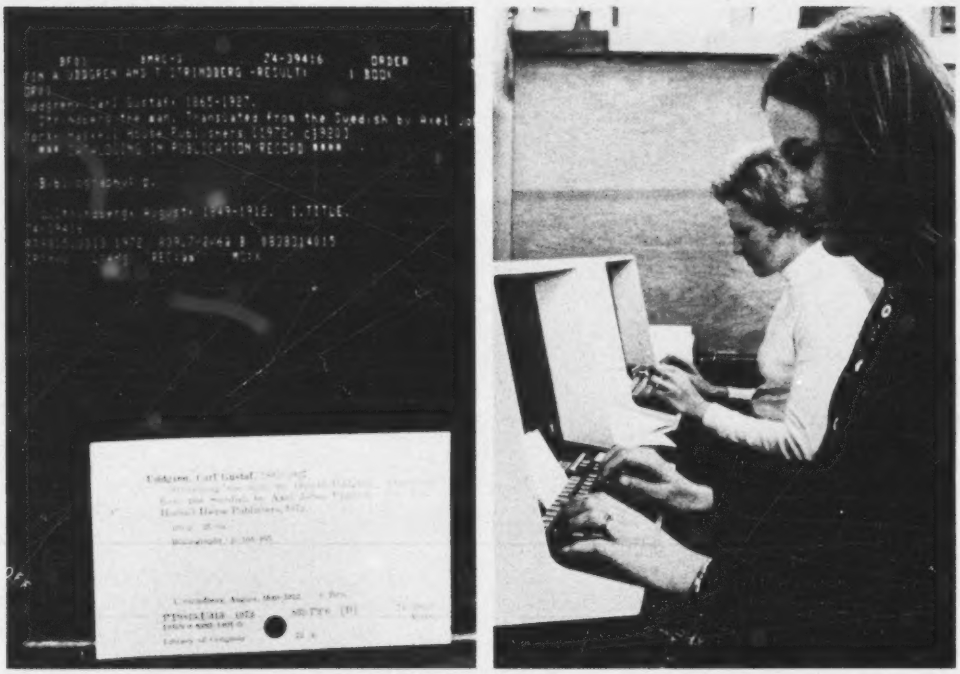
- At Duke University a previously idle cable channel which serves most dormitory common rooms is being operated by a student group during the current academic year with the aid of a $20,000 Sloan grant. If the project's programs of discussions, interviews, athletics, and cultural events win a sufficient audience, future support will be sought from a small increase in the student activity fee.

Libraries and Reading

The rapid growth of research collections in the nation's leading libraries, and their even more rapidly growing costs, have led some libraries to band together in consortia to promote sharing of resources and the automation of their bibliographic functions. The Foundation provided partial support in 1974 for such a consortium in the Northeast, the Research Libraries Group, composed of four large research libraries—Harvard, Yale, Columbia, and the New York Public Library. In 1976 an analogous combination was formed on the West Coast.

- Directors of the libraries of Stanford University and the University of California, Berkeley, have found that their holdings are doubling every 16 years and their expenditures are more than doubling every ten years. They concluded: "No single research library can acquire all the books it requires to keep up with the complex needs of graduate students and faculty it must serve."

Recognition of that fact led to a decision by the two universities to join forces in a Research Library Cooperative Program which will endeavor to make available to faculty and graduate students of the two institutions the combined resources of the libraries of both. A central feature will be the expan-



Libraries of the University of California, Berkeley, and Stanford University are cooperating to make their resources available to faculty and graduate students of both institutions. Stanford's computerized bibliographic system, shown here in operation, will be expanded to Berkeley as part of an effort to control rapidly rising costs of major research libraries.

sion of Stanford's computerized bibliographic system to the Berkeley library; this will make possible the rapid location of books and other materials in either system, and it will allow each library to monitor the other's acquisitions, so that unnecessary duplication can be avoided. Each library will build on its particular strengths. A regular system of transportation between the two campuses will be established for the movement of books and scholars, and reciprocal borrowing and lending procedures will be instituted.

Stanford and Berkeley hope that the system which they devise will be useful as a model to other institutions, and they will conduct exploratory studies aimed at expanding their cooperative program to other institutions in northern California and elsewhere on the West Coast. The Sloan Foundation granted three-year support of $300,000, payable to Stanford University; the Andrew W. Mellon Foundation provided complementary support, as it did for the Research Libraries Group.

• While it may be said that too many books are being published for the comfort of some librarians, for the blind or visually handicapped person the problem is that only about 5 per cent of them are translated into Braille or

into audio recordings. Few textbooks are so translated, and for more ephemeral material—correspondence, newspapers, and other periodicals—the blind person's usual recourse is to a live reader.

Among the several types of artificial reading devices now under development, a machine which converts printed text into synthesized speech has been selected by the National Federation of the Blind for trial and evaluation. The Federation will place six of the prototype machines in user situations around the country—in offices, college libraries, rehabilitation centers, and more briefly in private homes—to assess their social impact and, in a carefully structured formative evaluation, will feed back information about users' experiences to design engineers who are continuing to improve the machine. The Federation regards this as an unusual example of a product's ultimate consumers participating in its design.

In its present stage of development the Kurzweil reading machine, invented by a small firm in Cambridge, Mass., can scan a page of printed material in most common typefaces and transmit photoelectric information to a minicomputer which, relying on a fairly complex set of programmed rules, recognizes individual words and issues phonetic commands to a synthesizer for the production of speech sounds. The user controls the reading through a small array of push buttons; he can back-up, skip forward, pause and have a word spelled out, vary the reading speed up to 200 words per minute, and perform most of the other functions of active reading. Most high-school students in initial tests have been able to gain some proficiency with the machine in three or four hours.

The National Federation of the Blind, representing 50,000 members, considers the Kurzweil machine an unusually promising development and has organized a research program to insure that it is thoroughly evaluated and brought to its full potential. The Foundation made a two-year grant of $100,000 to the Federation for this program.

Updating Engineers

The continuing education of practicing engineers, to equip them to meet the changing requirements and opportunities of their profession, has been recognized as a necessity for many years by the Sloan Foundation, most notably in the creation in 1963 of the Center for Advanced Engineering Study at Massachusetts Institute of Technology. Increasingly, this continuing education is occurring in the places where engineers work, in small groups receiving university instruction through video technology—cable, microwave, or tape—supplemented by printed study guides and textbooks. Currently it is estimated that more than 15,000 engineers each year complete 30 to 45 hours of graduate instruction, for credit, at their job sites.

Twelve university schools of engineering which have been among the most

active in this field have now joined together to expand and strengthen the advanced on-the-job education available to mid-career engineers.

• The Association for Media-Based Continuing Education for Engineers (AMCEE) was organized in 1976 as a result of a series of conferences of engineering educators supported by a small Sloan grant to Colorado State University in 1975. Its original membership of twelve institutions* is expected to grow in a short time to twenty or twenty-five; it is headquartered at Georgia Institute of Technology.

The purposes of AMCEE are to establish a national network of institutions active in its field, to provide a forum for discussion, to coordinate efforts to reach a consensus on standards and use of materials, to provide a clearinghouse for information on available materials, to stimulate production of new materials, and to conduct formative evaluations of courses produced for television-based instruction in engineering. The principal medium to be used is videotape, with supporting print material; tape can be shipped anywhere, it can be replayed and stored by the user, it can be partially revised, and it can be erased and reused as updated courses become available. It also can be used on existing video-based distribution systems.

AMCEE's planners identified as one of its principal needs a revolving fund to supply capital for course production by member institutions. A committee of its board of directors will allocate funds among competing proposals, and those courses which recover their costs, through fees from universities and employers, will return the value of their awards to the revolving fund for investment in production of other courses. To establish this revolving fund the Foundation made a three-year grant of $250,000, payable to the Georgia Tech Research Institute.

These other grants were approved for Technology in Education activities in 1976:

Dance Notation Bureau, New York, N.Y. **$12,500**
For partial support of development of a computerized system of dance notation.

Earlham College, Richmond, Ind. **$15,000**
For partial support of a two-year project in computer-assisted instruction in which students will interact with, and help to instruct, one another by means of the computer.

University of Texas, Austin, Tex. **$20,000**
For a conference in the summer of 1976 on the Keller Plan, a self-paced system of instruction named after the psychologist Fred K. Keller and one of the most widely used such systems in the country.

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* University of California, Davis; Case Western Reserve University, Colorado State University, Georgia Institute of Technology, Illinois Institute of Technology, Massachusetts Institute of Technology, University of Michigan, University of Minnesota, University of South Carolina, University of Southern California, Southern Methodist University, Stanford University.

Neuroscience

The Particular Program in Neuroscience, announced in 1969, awarded its final grants, totaling $738,300, in 1976. This brought to $12.2 million the cumulative support provided by the program for development of the emerging field of neuroscience, which now may be said to have become established as a discipline in its own right.

Additionally, some $900,000 has been awarded in the form of Sloan Research Fellowships for neuroscientists, including $310,400 for 16 fellowships in 1976 (see Page 25). The Foundation will continue to award Sloan Research Fellowships in neuroscience, and the termination of the Particular Program does not preclude the granting of further support for neuroscience where exceptional opportunities arise. Any such grants would be made under the General Program of the Foundation; funds will no longer be allocated specifically for neuroscience.

President Wessell explained in the Report for 1969 the Foundation's reasons for entering a field which at that time hardly existed in coherent form: "The field is badly in need of special resources if it is to gain rapidly the impetus it requires. Because it is a new field, and does not fit tidily into the established disciplines, many conventional sources of support are closed to it, or are difficult to open. Foundation funds, over a relatively brief period of time, may help establish the field by reducing interdisciplinary barriers and bringing into being new research centers of excellence devoted to neuroscience, and may open to it the substantially greater support from other sources which it will ultimately require."

To a great extent the task undertaken in 1969 has been accomplished. Neuroscience now has firmly established centers of excellence in many leading institutions, and much of what we know about brain function has been learned in the last seven years. The discipline now attracts substantial support for

research and training, although it has shared in the leveling off or outright decline of federal support for basic research in recent years.

While the Foundation cannot possibly replace missing federal dollars one-for-one, its Neuroscience Advisory Committee recommended that some allowance be made for the fact that institutions which launched ambitious neuroscience programs with Sloan's encouragement were finding it more difficult than they expected to replace Foundation support with other funds.

All of the major grants in 1976, therefore, were in the nature of transitional and terminal support intended to ease the adjustment of existing programs to the new fiscal realities. (Similar terminal grants for neuroscience programs at Massachusetts Institute of Technology and the University of Virginia were awarded in 1975.)

Research and Training

The last two years of the Particular Program in Neuroscience have been concentrated on the development of as many young neuroscientists as available funds would permit. Included in this program focus are pre- and postdoctoral fellows and junior faculty.

- The University of California, San Diego (UCSD) conducts a neurobiology program which involves faculty from seven departments, including physics and mathematics as well as the core Department of Neurosciences. Previous Sloan grants, which totaled $1.47 million, have supported 47 graduate students and assisted 29 postdoctoral fellows. UCSD also has used Sloan funds to help establish the laboratories of ten new young faculty members in the departments of neurosciences, biology, and psychiatry. While much of the program's support now comes from government and other sources, it appeared appropriate to extend Foundation assistance for completion of the training of a number of Sloan-supported pre- and postdoctoral fellows. A two-year grant of $190,000 was approved.

- At the Albert Einstein College of Medicine of Yeshiva University a major research program in developmental neurobiology was initiated with Sloan support in 1971. This activity led to the creation of a new Department of Neuroscience in 1974. The multidisciplinary research, involving scientists from different departments in a common effort, has been highly productive and has continually opened up new lines of inquiry. The emphasis on collaborative interaction has made parts of the work difficult to fund from conventional sources, however; the Foundation therefore agreed to extend support of $220,000 for two years. Previous support totaled $880,000.

- California Institute of Technology in 1971 began a program in behavioral biology embracing studies of chemical and electrical aspects of brain function in four separate laboratories. By 1976 Caltech had built a new Beckman Laboratory of Behavioral Biology and added six new members to the

neuroscience faculty. The Foundation-assisted laboratories had trained 11 new Ph.D.'s; 19 more graduate students were working toward the doctorate, and 17 postdoctoral fellows had participated in the research. Observations by the Foundation staff and by neuroscientists from other institutions indicated that neuroscience has become a flourishing and integrated activity at Caltech. The Institute requested and received a one-year supplemental and terminal grant of $126,000. Previous Sloan support amounted to $610,000.

- At Rockefeller University four young scientists—a neuropharmacologist, two physiological psychologists, and a molecular biologist—are investigating the ways in which hormones are related to brain function and behavior. For example, corticosterone, released by the adrenal gland under conditions of stress, acts on certain brain cells in previously unknown ways to produce depression. The Rockefeller group has published 14 papers describing how these cellular events take place. In view of the current difficulty in finding support for younger scientists, the Foundation agreed to extend its support for one year at $75,000, supplementing a 1973 grant of $145,000.

International Communication

- Interchange of persons between laboratories has proved a fruitful means of advancing the growth of neuroscience across a broad variety of scientific fronts. Productive approaches and techniques developed in one laboratory can be propagated by this means in other laboratories and indeed across international boundaries. This is the purpose of a formal joint program adopted in 1973 by the University of Pennsylvania and Duke University in cooperation with research institutions in England, Poland, and Italy. Sloan support enables junior neuroscientists to spend a year working with senior scientists in other countries; intermediate-level and senior investigators spend shorter periods with foreign colleagues. Participants have testified to the great value of this cross-fertilization of ideas and were eager to see the exchanges continue. The Foundation agreed to extend renewed support over two years of $100,000, payable to the University of Pennsylvania. An equal amount was provided in 1973.

Three smaller grants, for the principal purpose of increasing communication among neuroscientists, were awarded in 1976:

Brandeis University, Waltham, Mass. **$4,500**
For a workshop conference on vertebrate neuro-ethology.

University of California, Los Angeles **$17,800**
For an assessment of manpower in the neurosciences.

University of Florida, Gainesville, Fla. **$5,000**
For partial support of a conference of directors of interdisciplinary programs in neurobiology and neurobehavioral sciences.

Other Grants

Twelve smaller grants for purposes other than the foregoing were approved in 1976. Most had some relation to education, and some were classified as civic grants, which are awarded in recognition of the Foundation's obligations as a corporate citizen of New York City and the national community.

Associated Councils of the Arts, New York, N.Y. **$15,000**
To support the consulting assistance of a marketing specialist to develop a pricing and merchandising plan for ACA services.

Council on Foundations, Inc., New York, N.Y.
For 1976 membership support. **$10,000**
In support of the 1976-77 speakers' program of the Foundation Luncheon Group. **$7,500**

Encounter Limited, London, England **$10,000**
Contribution to the emergency fund of *Encounter* magazine.

Institute for Architecture and Urban Studies, New York, N.Y. **$20,000**
In support of a survey of endangered designated landmarks in New York City and in partial support of the Institute's training program in preservation and adaptive reuse.

The Library of Congress, Washington, D.C. **$20,000**
For partial support of the Library's comprehensive review of present and future services.

University of Michigan, Ann Arbor, Mich. **$15,000**
For partial support of a new Office for Graduate Non-Academic Job Placement.

Robert R. Moton Memorial Institute, Inc., New York, N.Y. **$10,000**
For partial support of program development at the Moton Conference Center, Capahosic, Va.

NAACP Legal Defense and Educational Fund, Inc., New York, N.Y. **$20,000**
To assist the Fund in developing a program of deferred giving and bequests.

New York City Police Foundation, Inc., New York, N.Y. **$20,000**
In support of the New York City Police Academy Library.

University of Pennsylvania, Philadelphia, Pa. **$20,000**
In support of research on income-contingent student loans.

Princeton University, Princeton, N.J. **$5,500**
For partial support over two academic years of the *Princeton Journal of the Arts and Sciences*.

Policies and Procedures

The Alfred P. Sloan Foundation was established in 1934 by Alfred P. Sloan, Jr., and was incorporated in the state of Delaware. Mr. Sloan, who was for many years the chief executive officer of General Motors Corporation, was active in the affairs of the Foundation until his death in 1966.

The Foundation's basic interests are in science and technology, in economics and management, and in education and problems of society related to those interests. It operates through a General Program and through several Particular Programs, which are designed to concentrate specified resources on a closely defined problem area for a limited period of time.

The Foundation's program interests do *not* extend to religion, the humanities, the creative and performing arts, and medical research except for that conducted at the Sloan-Kettering Institute for Cancer Research. Requests involving activities outside the United States generally are discouraged, and the Foundation does not entertain requests for endowment funds, general support, or buildings, or for equipment which is not directly related to a Foundation-supported project. No grants are made directly to individuals.

Application may be made at any time for support of activities falling within the above guidelines. There are no deadlines and no special application forms except in the Sloan Fellowships for Basic Research. Letters of application usually are addressed to the President of the Foundation, and should state: (1) the specific nature of the problem to be attacked; (2) how the applicant plans to attempt to solve the problem; (3) the name(s) and qualifications of the person(s) to be responsible for the project; and (4) the expected cost and duration of the project. Often a preliminary letter of inquiry will be useful in helping the Foundation staff to determine whether submission of a full proposal would be appropriate.

A grant application should be accompanied by documents indicating the applicant's tax-exempt status and its classification as either a private foundation or a publicly supported organization.

The Foundation is governed by a Board of Trustees assisted by a professional staff. Final disposition of all proposals is the responsibility of members of the Board.

Financial Review

Financial Review

The financial statements and schedules of the Foundation, which have been audited by Haskins & Sells, independent certified public accountants, appear on pages 55 to 69. They include the balance sheet, the statement of income and funds, the statement of changes in financial position, the schedule of administration and investment expenses, the schedule of marketable securities, and the summary and schedule of grants and appropriations.

Investment and other income in 1976 amounted to $14,363,450, compared with $10,367,642 in 1975. The increase of $3,995,808 was due to higher dividend income in 1976. Investment expenses in 1976 totalled $348,470, of which $301,736 represented investment counsel fees. Provision for Federal excise tax amounted to $556,000 in 1976. These deductions from income totalled $904,470 in 1976, compared with $732,569 in 1975.

Net investment income was $13,458,980 in 1976, compared with net investment income of $9,635,073 in 1975.

The total of grants and appropriations authorized and administration expenses during 1976 amounted to $13,121,455, or $337,525 under net investment income of $13,458,980. Grants and appropriations totalled $11,912,295 while administration expenses amounted to $1,209,160. Over the Foundation's forty-two year history, the cumulative excess of grants and expenses over income has amounted to $56,188,063.

The total of grant and appropriation payments in 1976 was $12,955,146, compared with $12,372,536 in 1975. Together with 1976 administration expenses, investment expenses and Federal excise taxes paid, the total of cash expenditures in 1976 was $14,912,300, compared with $14,257,428 in 1975.

The market value of the Foundation's total assets of $297,704,552 at December 31, 1976, including marketable securities valued at $297,160,166, compared with total assets of $256,662,156 at December 31, 1975. A summary of the Foundation's marketable securities at ledger and quoted market value at December 31, 1976 appears on page 59.

A summary of grants by major classifications followed by a listing of grants made during 1976 will be found on pages 64 to 69. Grants and appropriations authorized and payments during the year ended December 31, 1976 are summarized in the following table:

Grants and appropriations authorized but not due at January 1, 1976	$15,587,124
Authorized during 1976	11,912,295
	27,499,419
Payments during 1976	12,955,146
Grants and appropriations authorized but not due at December 31, 1976	$14,544,273

The Foundation has a contributory retirement plan covering substantially all employees under arrangements with Teachers Insurance and Annuity Association of America and College Retirement Equities Fund which provides for purchase of annuities for employees. Retirement plan expense was $100,442 and $90,513 for 1976 and 1975, respectively.

The Internal Revenue Code imposes an excise tax at the rate of 4% on the net investment income of private foundations. The accompanying financial statements include provision for this tax. No Federal excise tax has been allocated to net gain on disposals of securities added to the principal fund, since the basis for determining gain or loss on disposals of securities under the Code resulted in a net loss for excise tax purposes.

Income from investments credited to the General Motors Dealers Appreciation Fund during 1976, after provision for Federal excise tax, amounted to $263,889. A grant of $200,000 to the Sloan-Kettering Institute for Cancer Research was authorized and applied against this Fund, as set forth on page 28. Grant payments from this Fund during the year 1976 amounted to $600,000, resulting in grants outstanding and unpaid at the end of 1976 of $800,000.

The net worth of the Foundation at December 31, 1976, based on quoted market values, was divided as follows:

	Total Assets At Market Value	Grants and Appropriations Authorized But Not Due For Payment	Accrued Federal Excise Tax	Fund Balances At Market Value
General Fund	$292,193,103	$13,744,273	$548,225	$277,900,605
General Motors Dealers Appreciation Fund	5,511,449	800,000	10,719	4,700,730
Total	$297,704,552	$14,544,273	$558,944	$282,601,335

HASKINS & SELLS
CERTIFIED PUBLIC ACCOUNTANTS

TWO BROADWAY
NEW YORK, NEW YORK 10004

AUDITORS' OPINION

Alfred P. Sloan Foundation:

We have examined the balance sheet of Alfred P. Sloan Foundation as of December 31, 1976 and 1975 and the related statements of income and funds and of changes in financial position for the years then ended. Our examination also comprehended the supplemental schedule of administration and investment expenses for the years ended December 31, 1976 and 1975 and the supplemental schedules of marketable securities at December 31, 1976 and grants and appropriations for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, such financial statements and supplemental schedules present fairly the financial position of the Foundation at December 31, 1976 and 1975 and the results of its operations and the changes in its financial position for the years then ended, in conformity with generally accepted accounting principles applied on a consistent basis.

Haskins & Sells

January 31, 1977

Balance Sheet

December 31, 1976 and 1975

	1976	1975
Assets		
Marketable Securities:		
Fixed income securities:		
U.S. Government and agency obligations	$ 35,380,063	$ 29,387,784
Other	17,382,636	22,011,230
Total fixed income securities	52,762,699	51,399,014
Common stocks:		
General Motors Corporation	44,493,253	44,493,253
Other common stocks	112,110,138	106,971,514
Total common stocks	156,603,391	151,464,767
Total marketable securities (quoted market: 1976—$297,160,166; 1975—$256,279,808)	209,366,090	202,863,781
Cash	544,386	382,348
TOTAL	$209,910,476	$203,246,129
Obligations and Funds		
Grants and Appropriations Authorized But Not Due for Payment	$ 14,544,273	$ 15,587,124
Accrued Federal Excise Tax	558,944	402,468
Fund Balances	194,807,259	187,256,537
TOTAL	$209,910,476	$203,246,129

Summary of Significant Accounting Policies

The Foundation maintains its accounts on a modified cash basis, which in effect is not materially different from the accrual basis of accounting.

Marketable securities purchased are carried at cost; those received by gift or bequest are carried at quoted market value at date of gift or bequest. Gain or loss on disposal of securities is determined generally on the basis of first-in, first-out cost, but in certain instances the identified certificate basis is used. Net gain or loss on disposals is applied to the principal fund.

Dividend and interest income, and investment expense are recorded on a cash basis. The unrecorded amount of interest and dividends receivable is not material in relation to net assets or fund balances.

Grant appropriations are accrued at the time authorized by the Trustees and the Federal excise tax is accrued in the year to which it relates. There were no significant unpaid administration expenses at either year-end.

Statement of Income and Funds

For the years ended December 31, 1976 and 1975

	1976	1975
INCOME:		
Investment income:		
Dividends	$ 10,575,393	$ 6,582,696
Interest	3,746,951	3,755,169
Other	41,106	29,777
	14,363,450	10,367,642
Less:		
Investment expenses	348,470	332,569
Provision for Federal excise tax	556,000	400,000
	904,470	732,569
Net investment income	13,458,980	9,635,073
Grants and expenses:		
Grants and appropriations authorized	11,912,295	11,381,366
Administration expenses	1,209,160	1,086,159
Total	13,121,455	12,467,525
Grants and expenses under (over) income for the year	337,525	(2,832,452)
Cumulative excess of grants and expenses over income from inception to:		
Beginning of year	(56,525,588)	(53,693,136)
End of year	(56,188,063)	(56,525,588)
PRINCIPAL:		
Balance at beginning of year	243,782,125	246,569,500
Net gain (loss) on disposals of securities	7,213,197	(2,787,375)
Balance at end of year	250,995,322	243,782,125
FUND BALANCES AT END OF YEAR	$194,807,259	$187,256,537

See Summary of Significant Accounting Policies on Page 55.

Statement of Changes in Financial Position

For the years ended December 31, 1976 and 1975

	1976	1975
SOURCE OF FUNDS:		
Investment and other income	$14,363,450	$10,367,642
Net gain (loss) on disposals of securities	7,213,197	(2,787,375)
	21,576,647	7,580,267
APPLICATION OF FUNDS:		
Grant and appropriation payments	12,955,146	12,372,536
Administration expenses	1,209,160	1,086,159
Investment expenses	348,470	332,569
Federal excise taxes paid	399,524	466,164
	14,912,300	14,257,428
INCREASE (DECREASE) IN FUNDS CONSISTING OF:		
Change in ledger value of investments	6,502,309	(6,739,950)
Change in cash balances	162,038	62,789
NET CHANGE IN FUNDS	$ 6,664,347	$(6,677,161)

See Summary of Significant Accounting Policies on Page 55.

Schedule of Administration and Investment Expenses

For the years ended December 31, 1976 and 1975

	1976	1975
ADMINISTRATION EXPENSES:		
Salaries and employee benefits:		
Salaries	$ 588,062	$ 544,467
Employees' retirement plan and other benefits	164,873	143,080
	752,935	687,547
Rent*	212,758	198,219
Program expenses	101,406	94,976
Office expenses and services	118,742	92,290
Reports and publications	28,920	25,133
Auditing and legal	41,133	28,284
Total administration expenses	1,255,894	1,126,449
Less: Allocation of administration expenses applicable to investments	46,734	40,290
Balance of administration expenses applicable to grant making	$1,209,160	$1,086,159
INVESTMENT EXPENSES:		
Investment counsel fees	$ 301,736	$ 292,279
Allocation of administration expenses applicable to investments	46,734	40,290
Total investment expenses	$ 348,470	$ 332,569

* The Foundation occupies office facilities under a lease which expires April 30, 1985 and provides for annual rentals, including real estate taxes and operating expenses, of approximately $205,000 for 1977, net of approximately $30,000 rental from sublease.

Schedule of Marketable Securities

December 31, 1976

SUMMARY	Ledger Amount	Quoted Market Value	
		Amount	Percent of Total Investment
Fixed income securities:			
U.S. Government and agency obligations	$ 35,380,063	$ 36,372,186	12.2%
Other	17,382,636	17,503,928	5.9
Total fixed income securities	52,762,699	53,876,114	18.1
Common stocks:			
General Motors Corporation	44,493,253	89,542,281	30.1
Other common stocks	112,110,138	153,741,771	51.8
Total common stocks	156,603,391	243,284,052	81.9
Total marketable securities	$209,366,090	$297,160,166	100.0%

FIXED INCOME SECURITIES	Principal Amount	Ledger Amount	Quoted Market Value
U.S. Government and Agency Obligations:			
Treasury Notes:			
6.25%—February 15, 1978	$2,500,000	$ 2,509,766	$ 2,532,800
7.125%—May 31, 1978	1,000,000	1,004,687	1,025,620
7.875%—May 15, 1979	1,080,000	1,101,600	1,134,670
6.875%—May 15, 1980	1,400,000	1,377,687	1,443,302
9.00%—August 15, 1980	1,000,000	1,057,500	1,095,620
7.375%—May 15, 1981	2,100,000	2,088,187	2,199,078
8.00%—May 15, 1982	2,500,000	2,557,188	2,687,500
8.00%—February 15, 1983	1,000,000	1,006,563	1,078,750
7.875%—May 15, 1986	3,252,000	3,520,017	3,496,908
Federal Home Loan Banks Consolidated Bonds			
7.75%—February 25, 1980	1,300,000	1,301,219	1,356,875

Schedule of

December 31, 1976 (Continued)

FIXED INCOME SECURITIES	Principal Amount	Ledger Amount	Quoted Market Value
Twelve Federal Land Banks Consolidated Bonds:			
7.50%—July 20, 1977	$1,090,000	$ 1,081,485	$ 1,103,625
5.125%—April 20, 1978	500,000	416,250	496,250
7.15%—July 23, 1979	2,000,000	1,934,375	2,062,500
7.30%—October 20, 1982	1,000,000	1,007,500	1,033,750
Federal National Mortgage Association Debentures:			
5.20%—January 19, 1977	3,000,000	3,011,250	2,996,250
7.85%—September 12, 1977	1,000,000	1,004,375	1,017,500
7.85%—June 11, 1979	1,000,000	1,018,438	1,045,000
7.05%—March 10, 1981	1,100,000	1,034,000	1,124,750
7.25%—June 10, 1981	300,000	297,656	309,375
6.65%—June 10, 1982	1,000,000	1,002,500	1,003,750
6.05%—February 1, 1988	1,000,000	996,250	918,750
7.00%—March 10, 1992	5,350,000	5,051,570	5,209,563
Total U.S. Government and agency obligations		35,380 063	36,372,186
Other:			
Undivided interest in demand notes:			
Atlantic Richfield Company	89,000	89,000	89,000
General Electric Company	1,233,000	1,233,000	1,233,000
Household Finance Corporation Sinking Fund Debentures			
4.625%—January 15, 1977	1,015,000	870,118	974,806
Citibank, N.A. certificate of deposit			
5.40%—April 19, 1977	300,000	300,000	300,534

Marketable Securities

FIXED INCOME SECURITIES	Principal Amount	Ledger Amount	Quoted Market Value
Morgan Guaranty Trust Company of New York Capital Notes			
6.375%—April 1, 1978	$1,000,000	$ 1,000,000	$ 1,004,460
Bankers Trust New York Corporation Debentures			
6.375%—September 1, 1978	1,000,000	997,500	1,003,100
General Electric Credit Corporation Notes			
7.00%—February 15, 1979	2,000,000	1,995,000	2,032,500
General Motors Acceptance Corporation Debentures:			
5.00%—September 1, 1980	1,300,000	1,300,000	1,248,000
5.00%—March 15, 1981	1,500,000	1,492,500	1,438,125
American Telephone and Telegraph Company Debentures:			
4.375%—April 1, 1985	1,500,000	1,518,210	1,290,000
8.75%—May 15, 2000	2,500,000	2,502,188	2,675,000
Aluminum Company of Canada, Limited Sinking Fund Debentures			
9.50%—March 1, 1995	1,000,000	1,012,500	1,031,250
International Paper Company Sinking Fund Debentures			
8.85%—March 15, 1995	1,500,000	1,553,750	1,612,500
Dow Chemical Company Debentures			
8.875%—May 1, 2000	1,474,000	1,518,870	1,571,653
Total other		17,382,636	17,503,928
Total fixed income securities		$52,762,699	$53,876,114

Schedule of

December 31, 1976 (Continued)

COMMON STOCKS	Number Of Shares	Ledger Amount	Quoted Market Value
Alcon Laboratories, Inc.	51,000	$ 1,811,451	$ 1,160,250
Aluminum Company of America	83,000	3,675,225	4,751,750
American Telephone and Telegraph Company	30,000	1,595,517	1,905,000
Baltimore Gas and Electric Company	50,000	1,389,649	1,337,500
BankAmerica Corporation	72,200	1,633,425	2,184,050
Caterpillar Tractor Co.	60,000	1,356,699	3,480,000
Champion International Corporation	66,000	1,770,638	1,806,750
Cincinnati Milacron Inc.	41,000	1,418,919	1,419,625
Citicorp	46,000	1,524,025	1,506,500
Coca-Cola Company	27,000	2,165,920	2,133,000
Continental Corporation	44,500	2,116,023	2,436,375
Dow Chemical Company	60,200	1,630,311	2,611,175
Eastman Kodak Company	86,154	2,369,357	7,409,244
Ex-Cell-O Corporation	60,000	1,242,824	1,545,000
Exxon Corporation	88,334	2,355,534	4,736,911
First Bank System, Inc.	40,000	1,891,325	1,770,000
First Chicago Corporation	72,456	753,105	1,657,431
First International Bancshares, Inc.	43,000	1,625,104	1,865,125
General Electric Company	50,000	2,287,451	2,781,250
General Motors Corporation	1,140,666	44,493,253	89,542,281
General Reinsurance Corporation	9,000	1,893,850	1,728,000
Halliburton Company	30,000	932,276	1,953,750
Hewlett-Packard Company	15,000	1,414,022	1,308,750
Illinois Power Company	113,000	2,895,392	3,107,500
International Business Machines Corporation	70,280	5,787,540	19,616,905
International Flavors & Fragrances Inc.	54,060	1,921,575	1,196,078
Johnson & Johnson	25,000	2,108,770	1,950,000
S. S. Kresge Company	70,000	2,057,103	2,852,500
Eli Lilly and Company	33,000	2,048,917	1,571,625
Lowe's Companies, Inc.	59,400	2,301,650	1,782,000
Marsh & McLennan Companies, Inc.	20,000	954,182	1,135,000

Marketable Securities

COMMON STOCKS	Number Of Shares	Ledger Amount	Quoted Market Value
Masonite Corporation	72,000	$ 1,745,298	$ 1,764,000
Merck & Co., Inc.	30,000	396,211	2,043,750
Mobil Corporation	47,000	1,419,765	3,055,000
Monsanto Company	35,000	2,407,950	3,084,375
J. P. Morgan & Co. Incorporated	70,000	1,310,880	3,937,500
J. C. Penney Company, Inc.	59,400	3,696,036	3,125,925
Perkin-Elmer Corporation	56,000	1,326,229	1,176,000
Philip Morris Incorporated	55,000	2,990,861	3,396,250
Pittston Company	39,000	1,544,158	1,389,375
Procter & Gamble Company	33,000	633,201	3,089,625
Ralston Purina Company	65,000	2,707,620	3,453,125
Revlon, Inc.	38,000	1,341,109	1,686,250
Roadway Express, Inc.	55,120	2,447,437	2,480,400
Schering-Plough Corporation	26,000	1,857,586	1,163,500
Jos. Schlitz Brewing Company	54,000	2,141,719	978,750
Schlumberger Limited	28,400	796,166	2,737,050
Sears, Roebuck and Co.	43,805	1,172,779	3,022,545
Skaggs Companies, Inc.	100,000	1,470,803	2,275,000
Southeast Banking Corporation	45,760	1,139,144	509,080
Southern Railway Company	42,000	2,445,091	2,604,000
Squibb Corporation	51,000	2,305,438	1,504,500
Standard Oil Company (Ohio)	39,000	2,251,618	2,993,250
Superior Oil Company	10,000	2,593,908	2,370,000
Union Camp Corporation	49,500	2,204,762	3,297,938
Union Carbide Corporation	41,300	2,647,509	2,555,438
United States Steel Corporation	62,250	2,622,643	3,096,938
Warner & Swasey Company	55,000	1,450,615	1,677,500
Weyerhaeuser Company	20,000	543,799	930,000
Wisconsin Public Service Corporation	76,100	1,572,024	1,645,663
Total common stocks		156,603,391	243,284,052
Total fixed income securities		52,762,699	53,876,114
Total marketable securities		$209,366,090	$297,160,166

Summary of

	Authorized But Not Due December 31, 1975	
Major Grants to colleges and universities		$ 7,918,316
Other Major Grants:		
American Association for the Advancement of Science	—	
American Council on Education	$ 100,000	
American Enterprise Institute for Public Policy Research	—	
Brookings Institution	500,000	
Cold Spring Harbor Laboratory	110,000	
Engineers' Council for Professional Development, Inc.	75,000	
Lincoln Center for the Performing Arts, Inc.	—	
Marine Biological Laboratory	53,000	
Memorial Sloan-Kettering Cancer Center	1,500,000	
NAACP Legal Defense and Educational Fund, Inc.	20,000	
National Bureau of Economic Research, Inc.	—	
National Federation of the Blind Inc.	—	
National Fund for Minority Engineering Students	600,000	
National Medical Fellowships, Inc.	150,000	
Philadelphia Regional Introduction for Minorities to Engineering (PRIME)	—	
Salk Institute	115,000	
Sloan-Kettering Institute for Cancer Research	1,200,000	
TOTAL OTHER MAJOR GRANTS		4,423,000
Appropriations:		
Sloan Fellowships for Basic Research (177 fellowships at 75 educational institutions)		2,328,492
Officer Grants		781,000
Book Program		—
Other Grants and Appropriations (none over $100,000 in 1976)		136,316
TOTAL GRANTS AND APPROPRIATIONS		$15,587,124

Grants and Appropriations

Changes During 1976			Authorized But Not Due December 31, 1976
Authorized		Payments	
	$ 7,468,950	$ 7,917,616	$ 7,469,650
$100,000		—	$ 100,000
—		$ 50,000	50,000
500,000		100,000	400,000
—		200,000	300,000
—		—	110,000
90,000		165,000	—
189,000		39,000	150,000
—		27,000	26,000
—		500,000	1,000,000
—		20,000	—
250,000		100,000	150,000
100,000		75,000	25,000
—		300,000	300,000
—		150,000	—
125,000		—	125,000
—		115,000	—
200,000		600,000	800,000
	1,554,000	2,441,000	3,536,000
	1,558,800	1,557,892	2,329,400
	747,618	778,618	750,000
	350,000	29,806	320,194
	232,927	230,214	139,029
	$11,912,295	$12,955,146	$14,544,273

Schedule of

	Authorized But Not Due Dec. 31, 1975	Changes During 1976		Authorized But Not Due Dec. 31, 1976
		Authorized	Payments	
American Assembly		$ 20,000	$ 20,000	
American Association for the Advancement of Science		121,460	21,460	$ 100,000
American Council on Education	$ 100,000		50,000	50,000
American Economic Association		20,000	20,000	
American Enterprise Institute for Public Policy Research		500,000	100,000	400,000
American Institute of Physics		50,000	50,000	
Arizona, University of		49,200	24,600	24,600
Associated Councils of the Arts		15,000	15,000	
Baruch College Fund		20,000	20,000	
Bentley College		20,000	20,000	
Boston University	8,109		8,109	
Bowdoin College		19,400	9,700	9,700
Brandeis University		4,500	4,500	
British Columbia, University of		14,800	7,400	7,400
Brookings Institution	500,000		200,000	300,000
California, University of	566,163	464,477	611,140	419,500
California Institute of Technology	218,071	175,000	248,571	144,500
Carnegie-Mellon University	208,109	350,000	208,109	350,000
Case Western Reserve University	348,109		213,109	135,000
Catalyst Inc.		20,000	20,000	
Center for Short-Lived Phenomena	20,000		20,000	
Chicago, University of	159,962	90,223	144,685	105,500
Claremont University Center		60,000	60,000	
Clark University	83,000		58,000	25,000
Clarkson College of Technology	9,611		9,611	
Cold Spring Harbor Laboratory	110,000			110,000
Colorado, University of	17,720	81,180	79,500	19,400
Colorado State University		34,400	17,200	17,200
Columbia University	339,962	39,000	291,862	87,100
Consortium for Graduate Study in Management	50,000		50,000	
Cornell University	208,612	36,600	106,912	138,300
Council on Foundations, Inc.	20,000	17,500	37,500	
Dance Notation Bureau		12,500	12,500	
Dartmouth College		370,000	111,000	259,000
Duke University	287,500	69,383	169,383	187,500
Earlham College		15,000	15,000	
East Asian History of Science Trust		20,000	20,000	
Educational Change, Inc.		20,000	20,000	
Encounter Limited		10,000	10,000	
Engineers' Council for Professional Development, Inc.	75,000	90,000	165,000	
Florida, University of	8,650	43,800	33,050	19,400
Florida Agricultural and Mechanical University		100,000	50,000	50,000

Grants and Appropriations

	Authorized But Not Due Dec. 31, 1975	Changes During 1976		Authorized But Not Due Dec. 31, 1976
		Authorized	Payments	
Florida State University	$ 8,109		$ 8,109	
Fordham University	8,109		8,109	
Foundation Center	40,000		40,000	
Freedom House, Inc.		$ 7,500	7,500	
George Washington University	120,000		60,000	$ 60,000
Georgia, University of		20,000	20,000	
Georgia Tech Foundation, Inc.		500,000		500,000
Georgia Tech Research Institute		250,000	100,000	150,000
Harvard University	328,928	179,315	393,643	114,600
Hawaii, University of	8,109		8,109	
Howard University	105,000		105,000	
Illinois, University of	17,720	14,800	25,120	7,400
Indiana University		14,800	7,400	7,400
Institute for Architecture and Urban Studies		20,000	20,000	
International Baccalaureate North America		16,000	16,000	
Iowa State University		14,800	7,400	7,400
Johns Hopkins University	9,611	32,000	25,611	16,000
Kansas State University	8,109		8,109	
Library of Congress		20,000	20,000	
Lincoln Center for the Performing Arts, Inc.		189,000	39,000	150,000
Louisiana State University	8,109		8,109	
Marine Biological Laboratory	61,650		35,650	26,000
Marquette University	40,000	75,000	40,000	75,000
Massachusetts, University of	100,000		100,000	
Massachusetts Institute of Technology	532,531	1,548,400	1,228,231	852,700
Memorial Sloan-Kettering Cancer Center	1,500,000		500,000	1,000,000
Miami, University of		62,000	62,000	
Michigan, University of	9,611	85,389	15,000	80,000
Michigan State University	172,109	32,000	188,109	16,000
Middlebury College		17,200	8,600	8,600
Minnesota, University of	18,090	17,200	26,690	8,600
NAACP Legal Defense and Educational Fund, Inc.	20,000	20,000	40,000	
National Academy of Sciences		81,550	15,000	66,550
National Bureau of Economic Research, Inc.	35,000	250,000	135,000	150,000
National Federation of the Blind Inc.		100,000	75,000	25,000
National Fund for Minority Engineering Students	600,000		300,000	300,000
National Medical Fellowships, Inc.	150,000		150,000	
Nebraska, University of	9,981		9,981	
New Mexico, University of	255,700		110,000	145,700
New York City Police Foundation, Inc.		20,000	20,000	

Schedule of

(Continued)

	Authorized But Not Due Dec. 31, 1975	Changes During 1976		Authorized But Not Due Dec. 31, 1976
		Authorized	Payments	
New York Institute of Technology	$ 87,500		$ 87,500	
New York University	210,000		210,000	
North Carolina, University of	205,109		138,109	$ 67,000
North Dakota State University		$ 8,857	8,857	
Northeastern University	9,611		9,611	
Northwestern University	358,109	414,650	366,709	406,050
Notre Dame, University of		450,000	50,000	400,000
Ohio State University	9,611	14,800	17,011	7,400
Oregon, University of	8,109		8,109	
Pennsylvania, University of	18,631	120,000	88,631	50,000
Philadelphia Regional Introduction for Minorities to Engineering (PRIME)		125,000		125,000
Pittsburgh, University of	8,109	14,800	15,509	7,400
Polytechnic Institute of New York	350,000	10,000	210,000	150,000
Princeton University	397,331	356,100	515,631	237,800
Public Communication Foundation for North Texas		20,000	20,000	
Purdue University	197,611	32,000	95,611	134,000
Research Foundation of The City University of New York	68,090	16,125	84,215	
Research Foundation of State University of New York	18,261	899,200	620,361	297,100
Rice University	8,109	36,600	26,409	18,300
Robert R. Moton Memorial Institute, Inc.		10,000	10,000	
Rochester, University of	200,000	29,600	174,800	54,800
Rockefeller University	16,759	113,800	111,159	19,400
Rollins College	35,000		35,000	
Rutgers University	8,109	36,600	26,409	18,300
Salk Institute	115,000	19,400	124,700	9,700
SIAM Institute for Mathematics and Society		88,000	30,000	58,000
Sloan-Kettering Institute for Cancer Research	1,200,000	200,000	600,000	800,000
Southern California, University of	9,981	14,800	17,381	7,400
Southern Methodist University	250,000		125,000	125,000
Spence School	150,000		150,000	
Stanford University	367,293	834,800	334,693	867,400
Syracuse University		150,000		150,000
Tennessee, University of		19,400	9,700	9,700
Texas, University of	30,962	259,517	131,479	159,000
Texas A&M University		17,200	8,600	8,600
Toronto, University of	9,981		9,981	
University Centers for Rational Alternatives, Inc.		20,000	20,000	
Utah, University of	8,109		8,109	
Vanderbilt University	176,500		122,500	54,000

Grants and Appropriations

	Authorized But Not Due Dec. 31, 1975	Changes During 1976		Authorized But Not Due Dec. 31, 1976
		Authorized	Payments	
Virginia, University of	$ 158,000		$ 87,000	$ 71,000
Washington, University of		$ 46,800	23,400	23,400
Washington University	362,950	38,800	232,350	169,400
Wayne State University		32,000	16,000	16,000
Western Institute for Science and Technology		19,800	19,800	
Western Ontario, University of	8,109		8,109	
William and Mary, College of		32,000	16,000	16,000
Wisconsin, University of	156,218	19,400	95,918	79,700
Worcester Polytechnic Institute	114,000		103,000	11,000
Yale University	409,592	291,789	255,681	445,700
Yeshiva University		220,000	110,000	110,000
Sloan Fellowships for Basic Research to be granted in ensuing year	1,550,000			1,550,000
Officer Grant appropriation for grants in ensuing year	750,000			750,000
Book Program		350,000	29,806	320,194
Other appropriations for grants and related expenses	41,316	28,377	55,214	14,479
	15,587,124	11,970,592	13,013,443	14,544,273
Reduction for Grant Transfers		58,297	58,297	
TOTAL GRANTS AND APPROPRIATIONS	$15,587,124	$11,912,295	$12,955,146	$14,544,273

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